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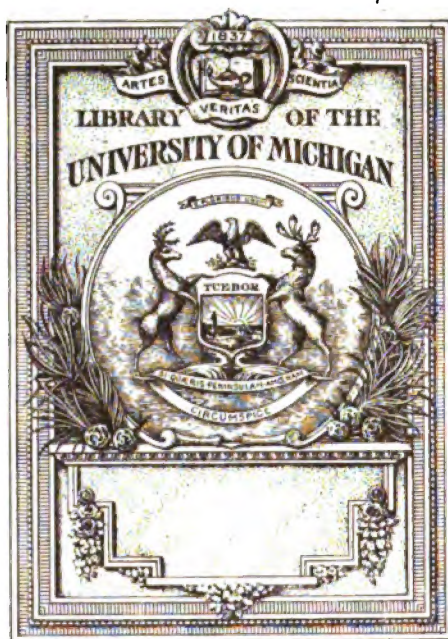
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TENTH BIENNIAL REPORT

OF THE

California

STATE BOARD OF HEALTH

OF



CALIFORNIA.

For the Fiscal Years from June 30, 1886, to June 30, 1888.



SACRAMENTO:

STATE OFFICE : : : J. D. YOUNG, SUPT. STATE PRINTING.
1888.

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MEMBERS OF THE CALIFORNIA STATE BOARD OF HEALTH.

President.

HENRY S. ORME, M.D..... Los Angeles.

Secretary.

GERRARD G. TYRRELL, M.D..... Sacramento.

W. R. CLUNESS, M.D..... Sacramento.

R. BEVERLY COLE, M.D..... San Francisco.

JAMES SIMPSON, M.D..... San Francisco.

J. M. BRICELAND, M.D..... Shasta.

C. A. RUGGLES..... Stockton.

STANDING COMMITTEES OF THE STATE BOARD OF HEALTH.

1. On the Salubrity of Public Institutions, Schools, Hospitals, Prisons, Factories, etc.

DOCTORS COLE, ORME, AND SIMPSON.

2. On Statistics relating to Life and Health, Modes of Employment and of Living, and the Comparative Healthfulness of different localities.

DOCTORS CLUNESS, BRICELAND, AND TYRRELL.

3. On Intoxicating Liquors, Inebriate Asylums, Pathological Influence of Alcohol, etc.

DOCTORS SIMPSON, COLE, AND RUGGLES.

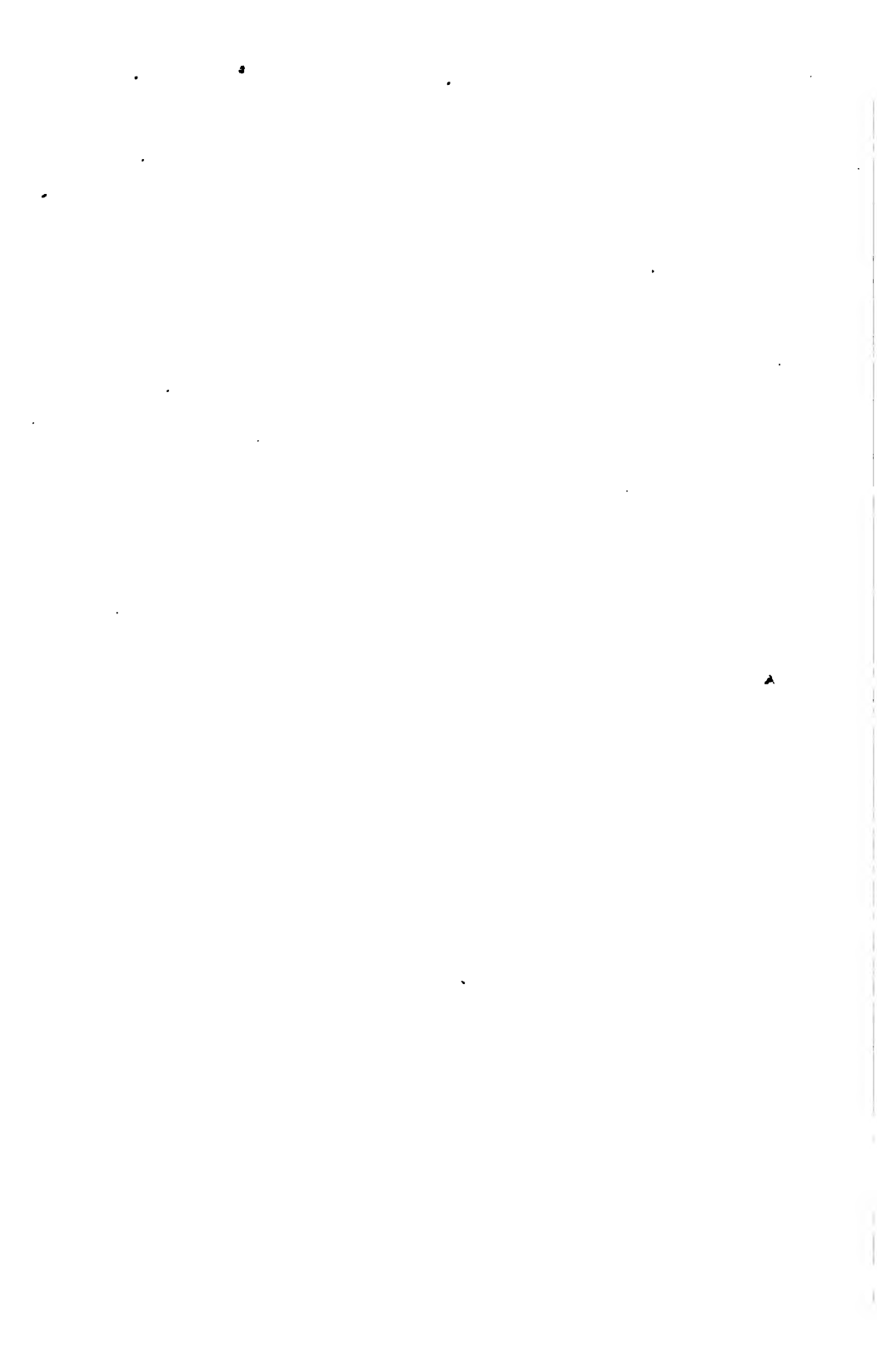
4. On Influence of Irrigation, Tree Planting, etc.

DOCTORS RUGGLES, ORME, AND CLUNESS.

On Legislative Business.

DOCTORS BRICELAND, ORME, AND TYRRELL.

On these Committees the Secretary of the Board is ex officio a member.



REPORT OF THE BOARD.

To his Excellency R. W. WATERMAN, Governor of California :

In presenting the tenth biennial report of the State Board of Health to your Excellency, the Board can, with much pleasure, refer to the fact of the increased popularity of the Board, and to the general desire of the public to aid its work in its watchful care of the public health, and its endeavor to prevent epidemic disease from entering this State.

It is also with gratification the Board can announce to your Excellency that through the forethought of the Legislature it was placed in a position to take such measures of prevention, that when the State was threatened with an epidemic of smallpox, it was enabled by the appointment of proper sanitary officers to prevent in a great measure its spread and limit its duration.

It has, however, become more than ever evident to the Board that, in order to confer upon the State that benefit for which the State Board of Health was organized, a change must be made in our health laws. At present they are inefficient, and lack that precision and mandatory power that are necessary to the proper maintenance of sanitary regulations. The laws relating to births, marriages, and deaths are not observed, and in order that we may obtain reliable statistics of the death rate throughout the State, it is absolutely necessary that a record of each death be made wherever it occurs. The necessity of this is obvious, for by it only can we determine the healthfulness of the different sections of the State; the relation that exists between climate and longevity; the effect of modes of life and living; the relative effect of drainage upon health, etc.; and above all, the power of determining positively and legally the question of death, where the right of succession to property is involved in the ascertainment of such fact. Another no less important result effected by a correct return of deaths is the prevention of crime, or its probable detection.

The safety of the people being the especial province of our Board, we consider the general vaccination of the public one of the most important aids for that purpose; and as a step in that direction we recommend that no child be admitted into the public schools without first showing satisfactory evidence that vaccination has been successfully performed.

We also recommend that a law be established making it compulsory upon all persons cognizant of the fact, to make known to the proper officer the existence of contagious or infectious disease, whenever such occurs in their person, family, or habitation.

We also recommend that it be made compulsory to establish local Boards of Health throughout the State. These should be required to act in co-operation with the State Board, keeping it advised of the appearance of epidemic or contagious disease, and the causes by which they are apparently promoted, that thus through them unification of purpose may be complete with the State Board, and preventive measures immediately instituted for the suppression of disease.

We desire to call your Excellency's attention to the subject of the mineral springs of this State. For many years this Board has endeavored to excite an interest in the great sanitary resources which lie undeveloped in these springs, and four years since, the Legislature, upon the recommendation of the Board, created the office of State Analyst, and passed a law making it his duty to analyze and give to the public the chemical constituents of these springs. Owing to the great number and varying properties of these mineral waters, the State Analyst found he had not assistance enough to do the work, and our springs, that should be a source of great revenue to our State, are still comparatively unknown. We would therefore recommend that a sufficient sum be set apart for the State Analyst to employ competent assistants in this great work, so that the medicinal value of our springs (which cannot be surpassed, or perhaps equaled, by any of the thermal springs of Europe) may be determined, and we may thus be enabled to offer to invalids additional inducements to visit our State to recuperate their health.

The subject of quarantine having engaged the attention of the Board for some years past, it is with great satisfaction that our Board can announce to your Excellency that through its persistent efforts it has been enabled to have a law pass Congress establishing quarantine stations at San Francisco and San Diego, which, we trust, will be so organized as to afford the utmost protection to the State from the invasion by sea of any infectious or contagious disease. We must not, however, neglect the danger which threatens us by land. Upon our southern border we are constantly menaced by smallpox, cholera, and yellow fever; the latter of which, being epidemic in many parts of Mexico, is a constant source of anxiety.

We therefore ask your Excellency to impress upon the Legislature the urgent necessity that exists for the continuation of the contagious disease fund, which did such excellent service for us within the past two years, not only in limiting the spread of disease upon this coast, but in enabling our Board to be represented at the National Conference of State Boards of Health, whereby coöperation with sister States for mutual protection was obtained.

We would also call your Excellency's attention to the fact that leprosy is being gradually introduced into this State, principally through Chinese immigration, and would recommend that all such cases found within this State be strictly segregated, and a law passed forbidding the landing or introduction of such persons, upon any pretense whatever, and their immediate return to the place from whence they came, if so imported.

We hereby append the reports requested by your Excellency as to the sanitary condition and administration of the various institutions receiving State aid.

In our Permanent Secretary's report will be found a detailed account of the diseases which have prevailed throughout the State, their mortality, and the means used for their suppression, together with the necessary expenditure of the Board.

We regret to say that the yearly appropriation given to the State Board of Health is not sufficient to enable it to do such work as properly comes within its province, and the Board is unanimously of the opinion that an increase of the appropriation would be a manifest benefit to the State.

We would also recommend to your Excellency that the law organizing the State Board of Health be so amended as to provide a per diem of ten

dollars for each member while engaged in the actual duties of the Board, as a slight compensation for the loss of time necessarily given in the service of the State.

H. S. ORME, M.D., President.
G. G. TYRRELL, M.D., Secretary.
W. R. CLUNESS, M.D.
JAMES SIMPSON, M.D.
R. B. COLE, M.D.
CHAS. A. RUGGLES, M.D.
J. M. BRICELAND, M.D.

ABSTRACT OF PROCEEDINGS

OF THE

QUARTERLY MEETINGS HELD DURING THE THIRTY-EIGHTH AND THIRTY-NINTH FISCAL YEARS, ENDING JUNE 30, 1888.

THE REGULAR QUARTERLY MEETING OF THE CALIFORNIA STATE BOARD OF HEALTH,

Was held in Sacramento July 3, 1886, at the usual hour.

Present—Dr. H. S. Orme, President; Dr. G. G. Tyrrell, Secretary; Dr. W. R. Cluness, Dr. J. M. Briceland, members; and by invitation, Professor W. B. Rising, State Analyst, and Hon. T. L. Thompson, Secretary of State. The absent members were Dr. R. Beverly Cole, Dr. Jas. Simpson, and Dr. H. C. Crowder, who each sent notes explanatory of their absence.

The minutes of the last meeting having been read and approved, the Secretary read the following letter from United States Senator George Hearst, in reply to a communication sent him regarding the passage of the quarantine bill:

WASHINGTON, D. C., May 9, 1886.

G. G. TYRRELL, Esq., Secretary State Board of Health, Sacramento, California:

DEAR SIR: Your favor of April twenty-seventh, in relation to the "Act to establish a Quarantine Station at the port of San Francisco," has been received, and the matter shall have my immediate attention and favorable consideration.

Thanking you for your kindness in specially directing my attention to this important matter, I remain,

Very truly yours,

GEORGE HEARST.

Which was received and ordered on file.

A communication from his Excellency, the Governor of Colorado, regarding the establishing of quarantine against the introduction of diseased cattle, was read and ordered placed on file.

The Secretary reported a visit to Truckee at the request of the citizens, which was approved, and a report thereof was ordered detailed in his biennial report.

The Secretary read his financial report for fiscal years thirty-six and thirty-seven, which was approved and ordered placed on file.

On motion of Dr. Cluness, the Secretary was instructed that having first obtained the consent of Dr. I. A. Watson, Secretary of the American Public Health Association, he was authorized by this Board to have reprinted in the ninth biennial report about to be published, Dr. G. Sternberg's prize essay on "Disinfection and Individual Prophylaxis against Infectious Disease," which was carried unanimously.

Professor W. B. Rising, State Analyst, made a verbal report upon the condition of the laboratory and the facilities possessed for the work designed to be accomplished by his office, but owing to a lack of assistants he was unable, without further aid, to carry out the provisions of the bill creating his office. He explained how the Secretary of the Viticultural Commission had analyses made. That Commission, having a fund at its

disposal, could pay for help, and the Analyst could hire assistants. If the State Board of Health had a like fund, there would be no difficulty in obtaining analyses of foods, drugs, etc., and the mineral springs of the State; the analyses of the latter require careful manipulation, which, under Professor Bunsen, of Vienna, he had successfully studied, and was of the opinion that with assistance an exhaustive analysis of the medicinal waters of the State could be made at the rate of one each month, which would inure to the great benefit of the State. He thought that with an appropriation of \$2,500 a year all the analytical work necessary could be done.

After the explanation of Professor Rising as to the necessity of funds to carry on his office in accordance with the intent of the law and for the benefit of the State; it was moved by Dr. Cluness—

That it is the sense of this Board that an appropriation of \$2,500 a year is required for the purpose of carrying out the object of the bill creating a State Analyst, and that the Governor be respectfully requested to ask for such appropriation in his next biennial message.

Carried.

Dr. J. M. Briceland moved that the thanks of the Board be returned to Professor Rising for his remarks, and that the Board pay his traveling expenses to this meeting, which was carried.

On motion, the Secretary was instructed to notify the absent members that they will be required to have their reports upon the subjects assigned them ready for the Secretary not later than the fifteenth day of August, as the biennial report must be in the hands of the State Printer by the first of September.

The Secretary announced to the members present the titles of the papers he had already received, as well as those promised for the biennial report, and it was agreed that not less than fifteen hundred copies be ordered printed by the State Printer for distribution.

There being no further business, after some desultory conversation upon sanitary matters, the meeting adjourned.

GERRARD G. TYRRELL,
Permanent Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH,

Was held in Sacramento October 16, 1886, at the usual hour.

Present—Dr. H. S. Orme, President; Dr. G. G. Tyrrell, Secretary; Dr. James Simpson, Dr. H. C. Crowder, Dr. J. M. Briceland, Dr. W. R. Cluness. Dr. R. B. Cole was not present, being absent from the State. Governor Stoneman and Hon. E. W. Maslin were present by invitation.

The minutes of the last meeting having been read and approved, the Secretary read a letter from Dr. Alemby Jump, of Downieville, relative to the appearance of typhoid fever in Forest City, and asking instructions in connection therewith. The Secretary informed the Board that he had replied to Dr. Jump's letter, advising him as to the course to be pursued. The Secretary also read the reply of Dr. Jump, detailing the result of his visit to Forest City, and his efforts to establish a sanitary reform there.

On motion, Dr. Jump's communications were placed on file, and the Secretary's action fully approved.

Dr. Cluness, in connection with the subject of typhoid fever, detailed a statement made in a late medical journal relative to the production of typhoid fever by dead animal matter decaying in wells, and considered

the subject worthy of continued investigation. The cases to which he referred were those in which a number of dead and decaying frogs, toads, etc., were found in a well which was undergoing a process of cleansing, and to the water from which the disease was attributed.

Dr. James Simpson considered that the genuine cases of typhoid fever, with the characteristic ulceration of Peyer's glands, are more rarely met with than formerly, and believed that a great many of the continued fevers that we now treat lack the essential characteristics of typhoid fever. He related some cases in confirmation of this view, and was inclined to believe in there being a typho-malarial fever, or, at least, a typhoid condition accompanying malaria.

Dr. J. M. Briceland remarked that in his town (Shasta) the source of all the supply of water to the inhabitants was derived from wells, and, to his knowledge, the remains of dead animals, such as snakes, toads, etc., have frequently been found in them, as a cause of the unpleasant flavor of the water, but he never found as a result of the drinking of this water any injurious consequences to speak of; he was doubtful of the theory that water so polluted could originate typhoid fever in the absence of the specific germ.

The Secretary read a communication from a Mrs. Fumey, of Fresno, asking the assistance of the State Board of Health to remove a nuisance. The Secretary informed the Board that he had written to the lady, detailing the proper course to be pursued by her in the premises.

On motion, the letter was placed on file, and the action of the Secretary approved.

The Secretary presented a communication from the proprietor of the "Sanitary Engineer," asking for a renewal of the Board's subscription.

On motion of Dr. Cluness, the subscription to the "Sanitary Engineer" was ordered discontinued, except one copy for the use of the Board.

On motion of Dr. Simpson, the Secretary was authorized to subscribe for one copy of the "Sanitary News," one copy of "Sanitary Engineer," one copy of "Sanitarium," and any other sanitary publication that might add to the efficiency of this Board, which was carried unanimously.

The Secretary desired to call the attention of the Board to an editorial which appeared in the "San Francisco Evening Bulletin" of October 1, 1886, entitled "Precaution Better than Cure," as follows:

An epidemic of smallpox prevails in southwestern Sonora. Its greatest ravages are at Guaymas, Hermosillo, and intermediate points on the line of the railroad. Those places are in daily communication with San Francisco—via the Sonora and Southern Pacific Railroads—but no steps have been taken to establish a quarantine at the State boundary line. It would be an easy matter to guard the single line of communication across the Colorado at Yuma.

It is known by experience that smallpox gives the authorities a good deal of trouble when it gets into this State; and the best plan is to fight it at a distance.

Will the State Board of Health take notice, and act accordingly?

All passengers should be quarantined at the border for a time covering the incubation of the fell disease.

And, also, the following reply, which was approved of by the Board, and, on motion, ordered spread upon the minutes:

EDITOR EVENING BULLETIN: In an editorial article in your valuable paper, on Friday evening last, entitled "Prevention Better Than Cure," you very truthfully remarked that smallpox, in an epidemic form, prevailed in southwestern Sonora, and complain that no steps have been taken to establish a quarantine at the boundary line. Further on you ask the suggestive question, "Will the State Board of Health take notice, and act accordingly?" In reply, allow me, as Executive officer of the Board, to say that at the session of the Legislature, January, 1886, Governor Stoneman, in his message, advised, and subsequently the State Board of Health, in anticipation of just such a contingency as has now arisen, demanded that a Contingent Fund be provided for the purpose of protecting this State by

quarantine against the approach of infectious diseases, if such danger should threaten us. It was asked that this fund be placed at the disposal of the Governor, to be used only at his discretion, and by the advice and at the request of the State Board of Health. I regret to say that the advice of the Governor to the Legislature was totally ignored, and the demand of the State Board of Health denied most positively.

At a subsequent meeting of the State Board of Health, alarming reports having been received from Sonora, the Governor was asked if there was any fund at his disposal that could be used for quarantine purposes. He replied that there was not, and that there were no means of obtaining a fund, except by a proclamation calling upon each county to levy a special tax for that purpose, and then such tax would be under the control of the county levying it, and would not be available by the State Board of Health, except by and with the consent of such county. Under these circumstances the State Board of Health can only watch with dismay the approach of preventable disease, being utterly powerless, from want of funds, to place barriers to its progress in the persons of an efficient corps of quarantine officers along our southern border. The State is now almost wholly defenseless against the approach of cholera, yellow fever, or smallpox, whenever they choose to cross our frontier, for which disastrous condition of affairs we have to thank either the disgraceful parsimony, criminal negligence, or, more probably, the unmitigated stupidity of the Legislature of 1885.

Yours respectfully,

G. G. TYRRELL, M.D.,
Permanent Secretary State Board of Health.

SACRAMENTO, October 3, 1886.

The Secretary then read report of Consul Willard, at Guaymas, reporting twenty-six deaths from smallpox, and a total death rate of forty-three for the month of September, 1886.

On motion the report was ordered on file, and the inability of the Board, for the want of funds, to order an immediate quarantine deplored.

The Secretary presented the ninth biennial report of the State Board of Health of California, just published, of which an edition of two thousand was ordered printed, which, having been considered by the Board, was approved, and the Secretary commended for his assiduity in getting out so promptly so valuable a report, which was ordered to be distributed.

Dr. Orme reported as our delegate to the National Conference of State Boards of Health and the American Public Health Association, held at Toronto, Canada, October 4 to October 9, 1886, that while en route he called upon Surgeon-General J. B. Hamilton, of the Hospital Marine Service at Washington, D. C., who assured him that he was much pleased to meet a representative of the State Board of Health of California, and that he would always be ready and willing in the future, as he had been in the past, to coöperate with our Board, and to use his official influence and power to assist us whenever we needed his aid in preventing and "stamping out" all epidemic disease which might threaten the invasion of our State, either by ocean travel or by way of our southern border.

The National Conference, as also the American Public Health Association, were largely attended by representatives of the different State Boards of Health, as also other health organizations of the United States and Provinces of Canada, with many of whose names we are all familiar as being the leading sanitarians and health officers of the country. The papers read and the discussions thereon were of a most interesting character, and of great practical importance to any one engaged in the good work of State preventive medicine.

A few of the many important subject-matters reported and discussed might be mentioned, being those which have from time to time engaged the thoughtful care and attention of our own Board. The first subject before the Conference was, "A comparative view of sanitary laws, and what changes are needed in those of Maine," which, after an animated discussion, was referred to a special committee to codify the laws of the different States and present them at the next meeting of the Conference.

The second subject was the "Transportation of dead bodies, especially

those dying from contagious or infectious diseases," which elicited a lengthened discussion and great diversity of opinion. It appeared, however, to be the sense of the majority of those present that the transportation of any or every dead human body, the subject of infectious disease, over the different great lines of travel, ought to be discouraged by the members of the medical profession. As to the length of time a body ought to be required to remain buried, of those dying of cholera, yellow fever, smallpox, etc., it was thought best, after a long and thorough discussion of the whole subject, not to fix the limit of number of years. Circumstances as to climate, seasons, heat and cold, etc., would necessarily have to govern in the majority of cases, and therefore that this should be left to the local health authorities of the different States to regulate.

The third subject, "How, in the investigation of the causes of disease, can State Boards of Health secure the best results?" After considerable discussion a committee of five was appointed to devise a plan for obtaining facts from the physicians in the different States through their respective State Boards of Health, and that the committee report at the next annual meeting a plan to that end, should it consider the same to be advisable.

Many other subjects of vital importance to State Boards of Health and sanitarians were reported upon and discussed, both at the Conference and at the meeting of the American Public Health Association, viz.: "Should vaccination be made compulsory;" "Local Boards of Health;" "On blank forms for a uniform system of vital statistics, etc."

A resolution was adopted at the Conference urging the importance and necessity of disinfecting and destroying the sputa of all persons suffering from pulmonary consumption, so as to protect those in attendance on or exposed to the disease. But the most important subject-matter, which could at the time interest our State Board of Health, was in relation to interstate notification in regard to infectious diseases and interstate coöperation in regard to inspections and other work for the prevention of the same. After a very full and free discussion of the whole subject the following resolutions were adopted by the National Conference, and the American Public Health Association was requested to indorse them:

WHEREAS, It is necessary for the protection and preservation of the public health that prompt information should be given of the existence of cholera, yellow fever, and smallpox: be it,

1. *Resolved*, That it is the sense of the National Conference of State Boards of Health, that it is the duty of each State, Provincial, and Local Board of Health in any locality in which said diseases may at any time occur, to furnish immediately information of the existence of such disease to Boards of Health of neighboring and provincial States, and to the local Board in such States as have no State Board.

2. *Resolved*, That upon rumor or report of the existence of pestilential disease, and positive definite information thereon not being obtainable from the proper health authorities, this Conference recommends that the health officials of one State shall be privileged and justified to go into another State for the purpose of investigating and establishing the truth or falsity of such reports.

3. *Resolved*, That whenever practicable, the investigations made under the preceding section shall be done with the coöperation of the State or local health authorities.

4. *Resolved*, That any case which presents symptoms seriously suspicious of one of the aforementioned diseases, shall be treated as suspicious, and reported as provided for in cases announced as actual.

5. *Resolved*, That any case respecting which reputable and experienced physicians disagree as to whether the disease is or is not pestilential, shall be reported as suspicious.

6. *Resolved*, That any case respecting which efforts are made to conceal its existence, full history, and true nature, shall be deemed suspicious, and so acted upon.

7. *Resolved*, That in accordance with the provisions of the foregoing resolutions, the Boards of Health of the United States and Canada represented at this Conference do pledge themselves to an interchange of information, as herein provided.

The resolutions in their entirety were adopted.

It was moved that the action of the Board of Health of the State of

Louisiana in dealing with the outbreak of yellow fever at Biloxie, in August last, be commended by this Conference of State Boards of Health, which was carried.

The National Conference refused to become a section of the State Boards of Health of the American Public Health Association, and moved that a committee be appointed to draft a constitution and by-laws with a view of placing the Conference on a permanent basis, and report at next meeting of the Conference.

This motion was unanimously adopted.

On motion, it was resolved to levy the sum of \$5 on each State and Province represented at the Conference, to meet incidental expenses.

Dr. J. N. McCormick was reelected President, and Dr. G. P. Conn, Secretary for the ensuing year.

The Conference adjourned to meet at Washington, D. C., at the same time of the meeting of the International Medical Congress.

The American Public Health Association, after transacting a great deal of business, including some important work bearing upon sanitation and State preventive medicine, and hearing the reports from the committees on State Boards of Health, and the report from the several representatives of the several State Boards of Health (California among the number, as regards her sanitary laws, etc.), adjourned to meet in Memphis, Tennessee, December, 1887, Dr. G. M. Sternberg being elected President, and Dr. Irving A. Watson reelected Secretary.

Dr. Cluness moved that whatever expenses Dr. Orme had incurred in behalf of the California State Board of Health be refunded him, and that his expenses as delegate to the American Public Health Association and the Conference of State Boards of Health be paid, which was unanimously carried.

Hon. E. W. Maslin stated, in reply to a question, that he had prepared some bills, and was preparing others, for presentation to the Legislature, embodying the recommendations presented to the Governor by this Board, and hoped that they would be so drawn as to comprise the legislation required for the efficiency of the Board.

Dr. Briceland, who was a candidate for the Legislature from Shasta, promised that, if elected, he would give these bills his utmost attention, and, if possible, carry them safely through the Senate, as he fully believed that such legislation would add to the safety of the people and the good of the community.

There being no further business, the meeting adjourned.

G. G. TYRRELL,
Permanent Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH,

Was held in Sacramento January 12, 1887, at the usual hour.

Present—Dr. H. S. Orme, President; Dr. G. G. Tyrrell, Secretary; Doctors Cluness and Briceland, members; and by invitation, Dr. Matthews of Tehama, Dr. Young of Stockton, Dr. Foulkes of Oakland, Professor Rising of Berkeley, and Hon. E. W. Maslin, legal adviser of the Board. Letters of apology were read from Dr. H. C. Crowder, Dr. Jas. Simpson, and Dr. R. B. Cole, explaining their absence from the meeting.

The minutes of the last meeting having been read and approved, Dr. Cluness, commenting upon the subject of the interment of dead bodies,

inquired of the President, Dr. Orme, if the American Public Health Association had decided upon any general rule to be observed about the period when bodies might be safely disinterred for transportation. He said that upon endeavoring to get a deceased body removed from Mazatlan, he discovered that no body could be disinterred and removed under five years' burial.

Dr. Orme replied that no fixed date had been recommended by the association, as such measures would be influenced by the climate, soil, etc., of each place, and therefore the regulations governing the disinterment would have to be governed by the place of interment, and adapted thereto.

The Secretary then read the report of Consul Willard, at Guaymas, who reported smallpox as still there, but confined chiefly to the lower classes and Indians.

The prevalence of glanders in several parts of the State was discussed, during which Dr. Matthews, of Tehama, related an instance of death from this disease in Butte County, in the person of a man who had become inoculated with the disease and speedily succumbed. He was of the opinion that legislative power ought to be sought to enable us to exterminate this dreadful disease from California.

After a very general discussion of the subject, it was the unanimous opinion of the Board that legislation should be had upon this matter immediately, to prevent the needless sacrifice of human life, which is sure to take place if the disease is permitted to spread.

The Secretary desired to call the attention of the members of the Legislature then present, Drs. Briceland, Matthews, and Young, to some matters pertaining to the State Board of Health, upon which legislation is desired in order to increase the efficiency of the Board and to add to the welfare of the State. He said that perhaps it was known to those gentlemen that smallpox was now upon the borders of this State, and at any time it may cross the line and invade California. Yellow fever was endemic in Mazatlan, Rosario, Guaymas, and at any moment may become epidemic, and be precipitated upon us. Cholera is still in Japan; is epidemic in South America, and will, doubtless, travel to Panama, from thence it will reach Mexico and probably California. To arrest any of these diseases by quarantine, there is not one dollar that can be used by the Governor for that purpose, therefore, the State Board of Health desires that a contingent fund be appropriated for that purpose. The sum should not be less than \$20,000, to be used at the discretion of the Governor and only by the advice and at the request of the State Board of Health. Should we happily escape from the threatened dangers, the fund would not be drawn upon. The Board, however, earnestly hoped such sum would be placed at the disposal of the Governor, if needed.

Drs. Matthews and Young, members of the Assembly, promised such measure their earnest support, and it was unanimously agreed that the Committee on Legislation be and is hereby instructed to ask the legislative Committee on Ways and Means to place such sum in the appropriation bill of this session of the Legislature.

The Secretary then explained that it was also sought to amend the health laws of California in relation to the burial of the dead. As now practiced, it requires no formality (except in cities having ordinances to that effect) to bury the dead, and as a consequence, crime is not unfrequently hidden in the grave. We now desire a law enacted that will not allow the burial, cremation, or other disposal of the dead human body, without first having obtained a permit, signed by a proper officer upon presentation to him of a certificate of death signed by the attending phy-

sician, and giving the name, age, nativity, sex, occupation, and cause of death; or, if deceased had no attending physician, then by the Coroner, or in his absence, by two reputable citizens, who shall certify to the best of their ability. It is hoped by this means to collect all the deaths in the State, to diminish crime, and obtain an authentic record which will legally establish the decease of any one whose death it is desirable to prove beyond doubt.

Again, the Board desires to amend the laws relating to births, marriages, and deaths, so that the vital statistics of this State might be rendered of some value in their compilation. It is proposed to pay a small fee for each birth, marriage, and death recorded, and to make it a penal offense to neglect this duty.

It is also proposed to amend the law relating to Boards of Health, and compel the establishment of such Boards in every county of the State, and if the organization of such Board or Boards is refused or neglected, then that the State Board shall have the power to organize such Boards, and render them a charge upon the county in the same manner as if organized by the county itself.

It is also proposed that a law be enacted compelling the vaccination of each and every child attending the public schools of this State, as is the law in New York and other progressive States.

It is also proposed to enact a law granting such mandatory power to the State Board of Health as will increase its efficiency and add to the welfare of the State.

Hon. E. W. Maslin then read the laws he proposed to present upon these subjects, and said the new Constitution stood in the way of obtaining any special legislation, as was the case before its adoption, but thought that such laws as were needed to insure the sanitary welfare of the State would be so general in their nature as to disarm all opposition to their passage.

The members of the Legislature and the Board having discussed the merits of each bill, it was resolved that the Committee on Legislation be requested to present the bills to the Legislature.

The members present promised them all the aid in their power to bestow, as they believed the bills to be drawn in the interest of the public, and for its benefit alone.

Professor W. B. Rising, State Analyst, stated that he had a deep interest in having the mineral waters of the State analyzed. He had received a large number of letters from parties abroad, asking information about the medicinal properties of the various mineral springs and a copy of their analysis, to which he was reluctantly obliged to reply that as yet no official analysis of them was made. In the matter of analyzing foods, drugs, etc., he thought he could illustrate it by what was being done in France, which he proceeded to do by explaining the different courses pursued, and in the most lucid manner gave an idea of what might be done in this State if the people were only educated up to its necessity. He detailed the case of a young man who was rendered dangerously ill by drinking grape juice adulterated with salicylic acid, which he declared was a common adulterant of unfermented wines on this coast. If an analysis of adulterated foods or drinks was reported by the State Analyst officially, stating the brand, etc., it would drive effectually such articles out of the market, and thus remove a constant factor in the production or intensification of disease.

Professor Rising also asked the approval of the Board to the following amendments to the law relating to the State Analyst, which he proposed having introduced this session of the Legislature, if indorsed by the Board:

SECTION 8. It shall be the duty of the State Analyst to maintain at the University, with the consent of the Board of Regents, a Museum of Chemistry. Here shall be collected and displayed a cabinet of chemical products, so arranged as to illustrate the various processes employed in chemical industries. This collection shall be supplemented by drawings, plans, etc., of existing chemical works, together with analyses of these various products; to the end that students of the University, and others interested in any branch of chemical industry, may have the opportunity of studying any or all the various processes used in chemical manufacture. He shall also collect samples of the various minerals, vegetables, waste products, of whatever kind, which are used elsewhere in chemical manufacture, or which may be so used, and examine, analyze, and investigate the same. He shall also collect such statistics and information relating to chemical problems as may be of interest or value to the State. He shall publish, from time to time, the results of his investigations pertaining to chemical industries in special bulletins, and in a biennial report to the Regents of the University of California.

SEC. 9. The State Analyst shall attend and participate, as he shall be able, in all meetings, conventions, and conferences of analysts in this country and in Europe, and permission is hereby granted him to absent himself from the State for that purpose; *provided*, he obtain the consent of the State Board of Health, the State Mining Bureau, the State Board of Viticultural Commissioners, and the Board of Regents of the University of California.

After some necessary explanations by Professor Rising of the nature of the proposed amendments and their practical utility, it was, on motion—

Resolved, That the amendments be approved and the bill referred to the Committee on Legislation for further action.

Which was carried.

It was discussed and approved that the Committee on Legislation ask for an appropriation of \$5,000, for two years, to procure such clerical assistance to the State Analyst as will enable him to analyze the mineral waters of the State and make an official report thereon.

A communication was read from Buford & Co., Indianapolis, proposing to dispose of to this Board copies of the proceedings of the "Conference of States Boards of Health," held at Toronto, Canada, October, 1886, which is to be bound in the report of the State Board of Health of Indiana.

On motion of Dr. Cluness, it was resolved that the Secretary be authorized to confer with the Secretary of the Conference of State Boards of Health, by letter, and ascertain if the firm of Buford & Co. is authorized to issue such proceedings, and if so, to order at least fifty copies.

The Legislative Committee having been instructed to get their proposed measures before the Legislature at the earliest moment possible, and no further business being before the Board, on motion, the meeting adjourned.

GERRARD G. TYRRELL,
Permanent Secretary.

A SPECIAL MEETING OF THE STATE BOARD OF HEALTH

Was held, at the request of the President, at the office of the Secretary, March 8, 1887.

A quorum being present, the object of the meeting, as explained by the Secretary, was for the purpose of taking into consideration the question of quarantining the southern border of the State, smallpox being reported as prevailing to an alarming extent in Los Angeles.

A telegram was received from Dr. R. B. Cole and Dr. James Simpson, stating that, in their opinion, a strict quarantine at this time against smallpox was useless, it having already invaded the State; in which opinion Dr. Meares, Health Officer of San Francisco, concurred.

The members present, having heard the reports from the President and

Secretary and a letter from Dr. Magee, of San Diego, were of the opinion that while strict quarantine might not now be applicable, yet an inspection of all trains coming from Texas, Mexico, and Los Angeles is very desirable, and specially is it desirable that arrangements be made to be ready to develop a strict quarantine system at any moment, and for this purpose the Secretary is hereby ordered to proceed to San Francisco, and confer with the railroad authorities, that coöperation with them may be secured, and report the result of the same at the next quarterly meeting.

On motion, meeting then adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH,

Was held in the office of the Secretary, Saturday, April 23, 1887, at the usual hour.

Present—Dr. Orme, President; Dr. Tyrrell, Secretary; Dr. H. C. Crowder, and Dr. J. M. Briceland. Absent, Drs. Cluness, Simpson, and Cole.

The minutes of the last meeting, and those of the special meeting, having been read and approved, the Secretary read a communication from Dr. Borde, relative to the sanitary condition of Tulare City, and also noting the absence of smallpox or other contagious diseases upon any of the trains he had inspected; which, on motion, was ordered placed on file.

The Secretary also read a communication from Dr. J. J. Choate, Medical Inspector at Colton, informing the Board of the absence of smallpox.

A telegram was received from Dr. Hagan, Health Officer at Los Angeles, by request of Dr. Orme, informing the Board of the condition of Los Angeles at the present time. The telegram read: "Not a case of smallpox in the city except two in hospital."

A telegram was also received from Dr. T. L. Magee, Health Officer at San Diego, which read: "Dr. Hillery reports a case of smallpox at Linda Vista, in the Mosher family." The telegrams were ordered on file.

The Secretary then read a communication from Deputy Collector of Customs at Yuma, offering to coöperate with the Board, and informing it that Dr. De Corse was duly appointed Inspector or Quarantine Officer at that city. The letter was ordered answered and placed on file.

A communication was also received from John Eitel, of Sacramento, appertaining to the sanitary care of rivers and the destruction by fire of all garbage and refuse matter, which was ordered placed on file.

A letter was also read from the Chief Signal Officer, asking for a set of our biennial reports, which was, on motion, granted and a set ordered to be furnished his office.

The Secretary then read the following report of the result of his conference with the railroad officials, as directed at the last meeting of the Board:

In accordance with instructions, your Secretary proceeded to San Francisco and there called upon J. A. Fillmore and R. H. Pratt, Superintendent and Assistant Superintendent of the Southern Pacific Railroad Company, and explained to them the situation and the urgent necessity that existed of guarding the avenues of egress which their roads had opened from Los Angeles to the transportation of smallpox. These gentlemen were very courteous, and expressed their willingness to do anything in their power to prevent the spread of smallpox in our State, and fully agreed with this Board as to the necessity of placing Medical Inspectors on the trains leav-

ing the infected district. They offered free transportation to our appointees if we would go south and attend to the details. Accordingly I submitted to Drs. Cole, Crowder, and Simpson the result of our conference, and suggested that they would go south with me, meet Dr. Orme, our President, and take what action might be necessary as a Board with power to act. Such action being deemed prudent, Drs. Cole, Crowder, and your Secretary left San Francisco for Los Angeles and the southern frontier, April 12, 1887. We arrived in Los Angeles on the thirteenth, when we were joined by Dr. H. S. Orme, President of the Board. It being the Sabbath day, we were driven round the city to take into consideration its topography, water supply, drainage, sewerage, and general sanitary condition, and as to how and where the cases of smallpox were quarantined. We also viewed the smallpox hospital and grounds, which were considered quite inadequate for the purpose designed, or for the wants of a large city like Los Angeles.

On Monday, April thirteenth, a quorum being present, the State Board of Health held a special meeting, at which were present W. H. Workman, Mayor of the city of Los Angeles, Supervisor Rowan, Health Officer Dr. M. Hagan, Dr. J. S. Baker, ex-Health Officer, Drs. Turner, Kuntz, and Ross.

After hearing the statements of Mayor Workman, Health Officer M. Hagan, Drs. Baker, Turner, and others, relative to the prevalence of smallpox, and the means taken for its suppression, Dr. Orme stated that up to that time they had thirty-three cases in the city, had them all quarantined, but thought that more vigorous measures ought to be taken at once with a view to "stamping out" the disease.

The Board of Health of Los Angeles consisted of the Mayor, the President of the Council, and three Councilmen, the Health Officer being an *ex officio* member.

After a prolonged discussion among the members of the State Board of Health, it was resolved that the following recommendations be tendered to the Mayor and Council, as the advice of the State Board of Health:

First—We recommend that a special Board of Health be appointed, consisting of the Mayor and four qualified physicians, who shall take sanitary charge of the city, and be invested with full powers in the present emergency.

Second—It being indisputably necessary that all cases of contagious disease shall be immediately reported to the Health Officer, we recommend that a neglect to perform this duty, upon the part of the attending physician, hotel keeper, lodging house keeper, or head of the family, shall be deemed a misdemeanor, and punished by fine, imprisonment, or both.

Third—The State Board of Health recommended universal vaccination and revaccination as often as an epidemic of smallpox is threatened, and that no child be permitted to attend the public schools who does not present a certificate of successful vaccination within five years, signed by a legally qualified physician. We further recommend that the city be immediately districted, and a duly qualified vaccinator be appointed to each district, whose duty it shall be to make a house to house inspection and vaccinate all who are unprotected.

Fourth—We recommend that a building be erected for the detention of all persons who have been exposed to the action of smallpox, or are suspected of having the disease, who shall be detained for not less than twelve days, or until the disease has manifested itself unmistakably.

Fifth—That in all deaths from contagious disease, public funerals be prohibited, and that all persons dying of contagious diseases be disinfected before or at the time of burial, and that interment be made as soon as practicable.

Sixth—That we recommend that an ordinance be passed making it a misdemeanor, punishable by fine, imprisonment, or both, for any hackman, driver, or owner of a public vehicle, to convey any person or persons sick with any contagious or infectious disease.

Seventh—We recommend that all persons suffering from smallpox in any hotel, lodging house, boarding house, or other tenement occupied by more than one family, shall be promptly removed to the smallpox hospital, and, when necessary, sufficient force shall be employed for that purpose.

Meeting now adjourned until 7:30 p. m.

Adjourned meeting held in rooms of Board of Trade at 7:30 P. M. The Board of Trade and City Council being present, Dr. R. Beverly Cole, in his usual masterly style and impressive manner, presented the recommendations of the State Board of Health, and offered them as the opinion of the Board, being the advisory Board of the State on matters concerning its sanitary interests. He explained most lucidly our purpose to the gentlemen present, and that as an advisory Board we could only recommend, our main object being the prevention of the spread of the disease beyond its present limitations. A mistaken notion had arisen that our visit was for the purpose of quarantining Los Angeles, which he assured the Council we had no power to do, neither did we express any such intention.

Dr. Jas. Simpson then addressed the meeting, and in eloquent terms assured the Council that the desire of our Board was to coöperate with the city authorities in taking the speediest methods of stamping out the disease and preventing its spreading throughout the State.

The Mayor and gentlemen present having thanked us for our interest in the welfare of the city, and promising to adopt our advice, the meeting of the Board adjourned.

March sixteenth, Doctors Orme, Crowder, Cole, and your Secretary went to San Diego, arriving in that city on the morning of March seventeenth. We learned that one case of smallpox had been discovered, in the person of a woman who had come from El Paso, Texas. She died in a few days, and no new case had developed at the time of our arrival. We visited the smallpox hospital, which is admirably situated on the "mesa," or tableland, above the city, and away from all possibility of infecting others, being isolated and capable of thorough ventilation. It was unoccupied except by the husband of the deceased woman referred to. He was in good health and detained as a precautionary measure until all possible danger from him had passed. At this city we engaged the services of Dr. T. L. Magee to board all trains and ships coming into San Diego, and gave him a copy of instructions for his guidance.

Returning to Colton we learned that there was no smallpox there, but at this point roads coming from the East intersect. We placed there two Inspectors, Dr. Jas. J. Choate and Dr. C. B. Brierly, who would run on alternate days, one to Indio and inspect the Southern Pacific trains, the other to Barstow and inspect the California Southern trains. We also commissioned Dr. M. F. Price, of Colton, as consulting physician, in case either Inspector needed his services.

We next visited San Pedro and Wilmington, and as this is a port of ingress from Mexico, and departure from Los Angeles, we placed Dr. W. A. Weldon here, whose duty will be to inspect all trains and ships arriving and departing.

Returning to Los Angeles we appointed Dr. Q. J. Rowley a Medical Inspector, and stationed him at Mojave to inspect all trains arriving from Los Angeles and the East. Learning, however, that two trains passed Mojave at midnight, and not wishing to disturb the passengers at that unseasonable hour, we appointed Dr. H. J. Bordé an Inspector and stationed him at Tulare City with orders to inspect the trains that passed Mojave without scrutiny. We thus placed a cordon of Inspectors embracing all points through which contagious disease might find its way into the interior of the State.

The following is a copy of instructions given to each Inspector, and posted at each station where our Inspectors are employed:

STATE BOARD OF HEALTH.

Instructions to Medical Inspectors for State Board of Health.

— — —, M.D.:

DEAR SIR: You are hereby appointed Medical Inspector for the State Board of Health for the district between — — —, and the following general rules are published for your guidance:

You will take a convenient position at your assigned station and inspect the emigrant cars on their arrival, at the same time making inquiries of the passengers as to the existence of any sickness on board at the time, or as to there having been any eruptive form of disease among them since leaving — — —. In this investigation valuable information may be obtained from the conductor and other employes of the train.

Should any case of smallpox be discovered upon any car, you will direct said car to be quarantined, or side-tracked, at a point suited to the well-being and comfort of the sick, and at the same time adapted to the convenience of the railroad company. It is desired that the work to be done should be so ordered and conducted as to subject the company to the minimum of inconvenience consistent with its energetic and efficient discharge in the interest of public health.

The other passengers on infected cars should be transferred to another car, but not mixed with passengers on uninfected cars. You will examine them carefully to ascertain whether there are any unvaccinated persons among them. All such should be immediately vaccinated, making at least two points of insertion. You will also vaccinate all upon the infected car, and detain them for a period of twelve days from the date of their exposure to the disease.

You will also inspect the express trains, and satisfy yourself that no cases of smallpox were on board. In this examination the conductor and other employes of the cars will be of essential service to you. Should you be satisfied of the presence of smallpox, you will adopt the means just recommended for emigrant cars.

If, upon inquiry, you find that any passenger upon a car has been sick with smallpox during the trip, and has died or been removed from the car, you will consider such car to be infected, and proceed therewith in the manner directed for cars upon which smallpox has actually been discovered.

When any car containing smallpox has been quarantined, you will aid the railroad authorities in seeing that the passengers thereon are well and comfortably cared for, and that the car, after the recovery or removal of the sick, is thoroughly disinfected, according to the rules laid down in the general instructions for disinfection issued by the State Board of Health.

You will be expected to keep a record of cars quarantined, cases of smallpox discovered, and vaccinations and revaccinations performed, and of every other proceeding under the duties assigned you, and to report the same in writing to the Secretary of the State Board of Health at Sacramento at least every third day.

The duties to which you are assigned are important yet delicate, and the State Board of Health trusts to your discretion and good judgment so that they be exercised with prudence, and with an endeavor to disarm opposition by a courteous and dignified appeal to reason, and the demonstration of the necessity of the measures adopted, rather than by the exhibition of arbitrary authority.

By order of the State Board of Health.

G. G. TYRRELL, M.D.,
Secretary State Board of Health, Sacramento.

On motion of Dr. J. M. Briceland the report was received, the action of the Board concurred in, and the proceedings ordered spread upon the minutes.

The Secretary informed the Board that the Inspectors appointed were doing their duty nobly and faithfully, and that so far no cases of contagious or infectious disease had passed their stations.

Dr. Orme stated that on April eighth he had received an urgent request from the City Trustees and the Health Officer, Dr. Magee, that he would visit San Diego officially, to give his advice and opinion on some cases of a doubtful nature, which the Health Officer had removed to the Smallpox Hospital. Dr. Orme immediately responded, and found six cases of well marked smallpox in the hospital, confirming Dr. Magee's opinion, and establishing his correctness as a diagnostician and his prudence as a health officer.

In the evening a meeting of the City Trustees was held, and expressions of thanks were tendered to Dr. Orme and the State Board of Health, and

resolutions appreciative of its efforts to assist the authorities in "stamping out" smallpox were passed.

After a full discussion of the present situation regarding smallpox, it was, on motion of Dr. J. M. Briceland—

Resolved, That if no new cases of smallpox developed between this time and the first of May next, our Secretary be instructed to discharge from duty our Medical Inspectors until such time as their services may again be required. We, however, deem it prudent to retain Dr. T. L. Magee on duty until the danger to San Diego has passed.

Carried.

Resolved, That the State Board of Health deprecate the attempts of a minor portion of the press in Southern California, and more especially of Los Angeles, to belittle the work of the State Board of Health, in attributing its efforts to suppress disease to any sectional feeling or desire to injure the southern part of the State, as this Board expends its efforts for the good of the whole State, and not for any particular part thereof.

Dr. Orme stated to the Board that Colonel George E. Waring was on the coast, and congratulated the City of San Diego for its enterprise in having a system of sewerage designed and executed by so eminent a sanitary engineer, and hoped that other cities interested in the welfare of their inhabitants would take the opportunity of Colonel Waring's visit to California to enlist his services in the carrying out of a perfect system of sewerage and drainage wherever needed.

There being no further business before the Board, on motion, it adjourned.

G. G. TYRRELL,
Permanent Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH,

Was held in the office of the Secretary, July 22, 1887, at the usual hour.

Present—Dr. H. S. Orme, President; Dr. Tyrrell, Secretary; Dr. W. R. Cluness, Dr. J. M. Briceland, Dr. H. C. Crowder.

The minutes of the last meeting having been read and approved, the Secretary read a communication from Dr. James Simpson, explaining his inability to attend the meeting owing to indisposition, and promising to report the status of smallpox in San Francisco to date.

A letter was also read from Professor R. Beverly Cole, dated from Calistoga, explaining his absence, and expressing his regrets at his unavoidable detention.

The Secretary then read a communication from Surgeon-General Hamilton, notifying the Board that in compliance with its request he had appointed Inspectors at Yuma and Nogales to guard against the approach of contagious disease at these points.

A communication was read from Dr. De Corse, Health Inspector at Yuma, giving information relative to smallpox on the border, and the precautions taken to prevent its entrance into California, which was ordered placed on file.

A communication from Dr. Crepin, Health Officer at Tucson, was also read, giving an account of the progress of smallpox in that city, which was also ordered on file.

The Secretary stated that he had received an answer to a dispatch sent to Dr. Walsh, regarding smallpox in Irvington. Dr. Walsh stated that there were three cases there in one family, and, in accordance with instructions from this Board, has placed a quarantine upon the house and isolated the family.

A case of smallpox was also reported in Oakland, which the Health Officer had in charge.

The Secretary informed the Board that he had telegraphed to Dr. J. L. Meares, the Health Officer of San Francisco, of the meeting of the Board this evening, with the request that he telegraph the number of cases of smallpox that had been reported in San Francisco since its outbreak three weeks ago. No answer had been received, and he was therefore unable to inform the Board to-night. Smallpox is, however, in San Francisco, and slowly spreading among the unvaccinated.

A communication was read from the Lick Paper Company, relative to an open sewer running past the Asylum for the Chronic Insane and their mill, and asking the action of the State Board in having the nuisance abated.

The Secretary informed the Board that he had replied to the communication and pointed out the course to be pursued by the mill company.

The letter was ordered placed on file, and the Secretary's course approved.

The Secretary then informed the Board, that for the past two sessions of the Legislature the Board had received a great deal of legal advice and clerical work performed in drawing bills relative to the laws of health from Hon. E. W. Maslin, who had received no compensation therefor, and thought the matter ought to be settled at once, as advice is occasionally needed in the interest of the Board.

Dr. Orme moved that the sum \$100 be drawn from the appropriation for the expenses of the Board and awarded to Mr. Maslin for legal services, and the Secretary be instructed to charge same among regular expenses when sending in his monthly expenditures to the Board of Examiners, which was carried unanimously.

The Secretary called attention to the necessity of rearranging the standing committees before commencing work on the next biennial report. It was therefore, on motion of Dr. Cluness—

Resolved, That the Secretary rearrange the committees, and present the same at the next regular meeting of the Board.

On motion:

Resolved, That any member of the State Board of Health who can attend the meeting of the National Conference of State Boards of Health and American Public Health Association, is hereby appointed a delegate, and that the Secretary furnish such member credentials as representative of this Board.

Which was carried.

Dr. Orme then read his report upon the epidemic of smallpox in Los Angeles, which occurred in this year. A synopsis of the report shows that the first cases were reported February 16, 1887. Next day four other cases were discovered, one of these at South Pasadena. Three others were added on the eighteenth; another on the nineteenth, making in all ten cases since the sixteenth of February. All of these cases were in young men, which, taken with the fact of their being almost simultaneously affected, would indicate a common source of infection. Investigation confirmed this theory, as it was proved that all of these young men were in the habit of frequenting a certain theater in the city where it is supposed that the infection was introduced by the clothing of some visiting Mexicans, smallpox being known to have existed in Mexico at that time. Of the ten cases, one died at South Pasadena on February twentieth, and four more in the city on the twenty-second. As a sequence, a city crowded with thousands of health and pleasure seekers, was on the verge of a panic. Reports now began to come in from other localities. In Lugo settlement, Downey, Elsinore, Ravenna, Bal-

lona, and Green Meadows cases developed. It reached San Diego, and down to Ensenada, on the Gulf of California.

The prevalence of smallpox continued from the sixteenth day of February to June, 1887. During that time one hundred and twenty cases occurred in Los Angeles, with fifteen deaths. In the County of Los Angeles there were fifty-six cases, with six deaths. In San Diego there were twelve cases, with two deaths. In Elsinore there were three cases and two deaths. In Ontario there were two cases, in Ventura two cases; making a grand total of one hundred and ninety-six cases and twenty-five deaths. The mortality was about 12½ per cent, which is much less than usually observed in epidemics of this kind. A noticeable fact is the general absence of the usual disfiguration, very few cases showing any trace of pitting, on recovery from the disease, which indicated its generally mild character. Los Angeles, at the time of the invasion, was crowded with strangers, and it is estimated that at least ten thousand people fled from the city, to avoid contagion. This was, in a great measure, owing to the San Francisco and other papers exaggerating the extent of the epidemic, and the action of the local papers in trying to conceal the fact that smallpox existed. Dr. Orme, at the very outset of the epidemic, addressed a letter to the Supervisors, advising them of the presence of the disease, and of the remedial measures to be adopted, offering the services of the State Board of Health in endeavoring to allay the excitement and exterminating the disease. Accepting Dr. Orme's suggestions, the State Board of Health had circulars printed, upon the management of smallpox, and distributed throughout the city and county. Dr. Orme personally superintended the appointment of efficient and competent physicians to act in the emergency. The disease becoming still more formidable, the President deemed it his duty to call the State Board of Health together for consultation, which met, and, in conference with the Mayor and City Council, gave such recommendations as seemed to them to be adapted to the occasion. It was also decided to consult with the railroad authorities, and place medical inspectors along the route of travel, to prevent the disease extending through the State. The report then narrates the different means adopted in this city, the placing of the sick under the charge and care of the Sisters of Charity, etc., and gives the expenses of the four months during which the epidemic existed as \$18,000 for the city, and \$21,000 for the county, and incidentally, he says, many more thousands must be added to our expenses. In fact, says the report, nothing could be done in connection with the disease that did not cost a fabulous price. In conclusion, the doctor notices the extreme bitterness of the Los Angeles press upon the event of the State Board's visit to that city, and condemns its unnecessary hostility on that occasion.

On motion of Dr. Briceland, the report was accepted and ordered printed in the next biennial report of the Board in extenso.

There being no further business before the meeting, it, on motion, adjourned.

G. G. TYRRELL,
Permanent Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH,

Was held in the office of the Board, October 15, 1887.

Present—Dr. H. S. Orme, President; G. G. Tyrrell, Secretary; Drs. Simpson, R. B. Cole, H. C. Crowder, and J. M. Briceland. Absent—Dr. W. R. Cluness, who was absent from the city.

The minutes of the last meeting having been read and approved, a communication was read from the editor of the "Sanitary News," and ordered placed on file.

A bill for \$2 subscription to the "Sanitary News" was presented and ordered paid.

The Secretary then read a communication from Dr. C. A. Lindsley, Secretary of National Conference of State Boards of Health, announcing an assessment of \$5 on each State Board of Health, to defray expenses of Conference, which, on motion of Dr. H. C. Crowder, was received, and the assessment ordered paid.

The following communication was received from the National Conference of State Boards of Health:

SECRETARY'S OFFICE, NEW HAVEN, CONN., }
September 17, 1887. }

DEAR SIR: At the session of the National Conference of State Boards of Health, held in Washington September 8, 1887, the Committee on Interstate Notification made the following report:

Report to the International Conference of State Boards re Notification of Infectious Disease.


Your committee begs leave to report the following resolutions:

Resolved, 1. That the Conference reaffirms the principles contained in the resolutions adopted by it at its meeting in Toronto, 1886.

2. That those communicable diseases hereinafter mentioned, prevalent in certain areas, or which tend to spread along certain lines of travel, be reported to all State and Provincial Boards within said area or along said lines of communication.

3. That in the instances of smallpox, yellow fever, cholera, and typhus reports be at once forwarded, either by mail or telegraph, as the urgency of the case may demand; and, further, that in the instances of diphtheria, scarlet fever, typhoid fever, anthrax or glanders, weekly reports where possible be supplied, in which shall be indicated, as far as known, the places implicated and the degree of prevalence.

All of which is respectfully submitted.

PETER H. BOYCE,
HENRY B. BAKER, 
J. BERRIAN LINDSLEY,
BENJ. LEE,
J. F. REEVES,
E. M. HUNT,

Committee.

The report having been read, it was voted that the vote on its adoption be taken by States. The vote, being so taken, was unanimous in its favor, by all the States and Provinces represented by delegates present.

The following resolution, offered by Dr. Reeves, of Wisconsin, and amended by Dr. Lee, of Philadelphia, was adopted:

Resolved, That the Secretary of this Conference be requested to send copies of the resolution on Interstate Notification of Contagious Diseases to the executive officers of all Boards of Health belonging to this Conference, and to request from each of such Boards as are not represented here a vote upon the same, for record as an appendix to the minutes of this meeting.

If your State was not represented by a vote at the Conference, will you please inform the undersigned of the vote of your Board, in compliance with the last resolution, at your earliest convenience.

Very respectfully,

C. A. LINDSLEY,
Secretary of the Conference.

On motion of Dr. R. Beverly Cole, it was regretted that this Board was not represented at the last Conference of State Boards of Health, and that we are heartily in sympathy with the spirit of the resolution offered, and desire to record the vote of this Board in the affirmative, which was carried unanimously.

The Secretary presented and read a communication from Mr. Richard Gray, General Superintendent Freight Department, Southern Pacific Railroad Company, asking the Secretary of this Board to telegraph Dr. R. Rutherford, Health Officer of Houston, Texas, that this coast was free from

cholera, and that the quarantine placed on fruit coming from this State was unnecessary on the part of the State Board of Health of Texas.

The Secretary informed the Board that he had answered this communication, and sent a copy of the following dispatch:

OCTOBER 6, 1887.

Dr. R. RUTHERFORD, State Board of Health, Houston, Texas:

If your quarantine of fruit includes California, it is wholly unnecessary, as no cholera has existed in this State for thirty years. Please answer.

G. G. TYRRELL,
Secretary California State Board of Health.

To which Dr. Rutherford sent the following reply:

To G. G. TYRRELL, Secretary California State Board of Health:

Fruit from California not quarantined, only it must be accompanied by affidavit, so that I may know that it is from California.

HOUSTON, TEXAS.

R. RUTHERFORD,
Secretary Texas State Board of Health.

He had also telegraphed to Mr. Gray the result of his action, which seems to be satisfactory to the railroad company.

On motion, the action of the Secretary was indorsed and approved by the Board.

Dr. Simpson moved that the Secretary be authorized to enter into communication with the Southern Pacific Railroad Company, if necessary, and also Health Officer Rutherford, and take such action as he deems best for the interest of California under the various changing conditions that may arise appertaining to the question of interstate quarantine, which was carried.

Dr. R. Beverly Cole moved that the Secretary be authorized to have executed a new and appropriate seal for the use of the Board. Carried.

The Secretary having been appointed at the last meeting of the Board a committee to report upon changing the standing committees, reported that the committees heretofore organized by the Board are well adapted for the duties imposed upon them, and recommends that they be continued as heretofore, which, on motion of Dr. R. B. Cole, was accepted and the committees continued.

On motion of Dr. R. B. Cole, it was—

Resolved, That each member of this Board be requested to visit at least one of our public health resorts during the coming season, and prepare a report, based upon his observations and investigations, as to its sanitary condition.

Which was carried.

Dr. Simpson moved that the Secretary be requested to prepare a list of our public health resorts, and furnish a copy to each member of the Board, with a view of selecting the points he may find most convenient to visit; and upon the selection being made by a member, the Secretary is instructed to notify the proprietor or occupier that such a member is designated to visit and report upon the sanitary condition of the establishment; which was adopted unanimously.

Dr. H. S. Orme moved that the Secretary be requested to place himself in communication with Surgeon J. B. Hamilton, U. S. M. H. Service, notifying him that it is currently reported that smallpox, in a virulent form, prevails in the village of Tubac, between Nogales and Tucson, Arizona Territory, and that we deem it our duty to call his attention to the fact, with a view of his investigation of the same, and, if thought best, to renew the quarantine on the border to prevent its spread over the Territory, which was adopted.

The Secretary presented the monthly circular just published, which met the approval of the Board.

There being no further business, the meeting adjourned.

GERRARD G. TYRRELL,
Permanent Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH,

Was held in the office of the Secretary, January 5, 1888.

Present—Dr. H. S. Orme, President; G. G. Tyrrell, Secretary; Dr. W. R. Cluness, Dr. R. B. Cole, Dr. H. C. Crowder, Dr. J. M. Briceland, members, and Dr. C. A. Ruggles, Stockton, by invitation. Absent—Dr. Jas. Simpson, San Francisco.

The minutes of the last meeting having been read and approved, a communication was read from the National Conference of State Boards of Health in reference to questions for discussion at the next meeting of the Conference. Communication was received and ordered placed on file.

It was also moved that a committee of two members of this Board be appointed to represent this Board, and to formulate a question or questions to submit to the Conference of State Boards of Health, and that each member of this Board is hereby requested to send, within ten days from date, such questions to the committee as they would like to have considered by it, and that the action of this committee be accepted as the action of the Board, which was unanimously carried. The President appointed Dr. R. B. Cole and Dr. W. R. Cluness as that committee, the Secretary being *ex officio* a member.

A communication was received from the Board of Health of San Francisco asking the State Board of Health to aid it in "stamping out" smallpox, now prevalent in San Francisco, by appointing Inspectors on trains coming into the State, and out of San Francisco, to prevent the spread of the disease, which, on motion, was read and placed on file.

A communication from the American Public Health Association was read, asking a contribution of \$5 as dues to the Association, which, on motion, was authorized to be paid by the Secretary.

A communication from Dr. Lindsley, Secretary of Conference of State Board of Health, inclosing a form of notification of infectious disease, was read, and on motion of Dr. H. C. Crowder, it was resolved that the Secretary is instructed to have a somewhat similar form printed for the use of this Board, and that the Secretary be requested to notify other States of the presence of a limited number of cases of smallpox in California, which was carried.

On motion of Dr. R. B. Cole, the Secretary was instructed to have one thousand copies of a circular printed, intended as a guide in the formation of local Boards of Health, for Supervisors, Trustees, or Councilmen, and also defining the duties of Health Officer of the same, which was carried.

A letter from Dr. Probst, Secretary of the State Board of Health of Ohio, was read, inquiring how many copies of the proceedings of the Conference of the State Boards of Health will be required by this Board. After some discussion, it was, on motion of Dr. J. M. Briceland—

Resolved, That this Board order three hundred copies of the publisher for distribution, and that a copy be sent to each of the correspondents of this Board, and to every Board of Health in the State.

Which was carried.

Dr. Cluness moved that twenty thousand copies of the Board's circular on smallpox be reprinted, with whatever additional remarks on vaccination that the Secretary may deem suitable at this time, which was carried.

The Secretary stated that at the request of the President he had addressed an official communication to the Board of Supervisors of Los Angeles County, asking them to appoint a Health Officer for the town of San Pedro, or Port of Wilmington, information having been received that the sanitary condition of that town was in such a deplorable state as to foster and propagate infectious or contagious disease if such should be developed. The Supervisors in their reply stated they would give the matter their earliest attention.

On motion, the action of the Secretary in this matter was indorsed and approved.

The Secretary reported that on December 14, 1887, he had visited Truckee, Nevada County, officially, to examine into the cause of the frequency of typhoid fever in that town, especially among young girls, and discovered that the privies attached to the school house where the children went were in a most insanitary condition, the department used by the girls being devoid of ventilation, except through a hole at the back of the seat, which carried the polluted air right under the children as they sat down, and out into the closet. This privy had been used by a child suffering from typhoid fever.

On motion, the Secretary was ordered to elaborate this report when making his biennial report to the Board. Carried.

The Secretary read the following communication from the Board on "Vaccination," which was ordered spread upon the minutes:

VACCINATION.

A Timely Warning from the State Board of Health.

The State Board of Health, being advised of the gradual progress of smallpox in several parts of the State, deems it its duty to warn the public against delay in availing itself of the only known prophylactic against the disease, namely, vaccination. The supply of pure bovine virus upon the coast is now ample, its use is almost perfectly devoid of danger, and its protective power to guard the system against the invasion of smallpox is unquestioned; if in a few isolated instances, through some peculiarity of constitution, smallpox is contracted after successful vaccination, the disease is modified or rendered so mild as to be comparatively without danger. From the fact that this State has been free from smallpox for so many years there is necessarily a large number of persons in our midst who are susceptible to the disease. Once smallpox is fairly started this fresh food for its maintenance is sufficient to render the disease epidemic in many places and the loss of valuable lives a certainty. To say nothing of this, its humanitarian aspect, the monetary loss an epidemic would cause our citizens and the injury it would produce in the brilliant prospects of our State is beyond computation.

These dire but positive results can all be avoided, death averted, and perfect safety assured by efficient vaccination.

The Board advises, therefore, immediate action. Let competent physicians be appointed in every city and town in the State as public vaccinators, and if necessary offer this God-given boon free to all. There is no city, town, or hamlet that can, for pecuniary consideration, afford to harbor a single nidus for smallpox when the means of prevention are so certain, so easy, and so positively effectual.

H. S. ORME, M.D.,

President.

G. G. TYRRELL, M.D.,

Secretary California State Board of Health.

The Secretary read a communication from the German Vice-Consul, relative to the death of a person, a certificate of which was required to establish his identity. This was read for the purpose of showing the necessity of having our statistics and registration of deaths rendered as nearly correct as possible, which can only be done by changing the law so as to make registry by County Recorders compulsory.

On motion, it was—

Resolved, That the Committee on Legislation be instructed at the next meeting of the Legislature to attend to this matter, and use all legitimate means to have our present laws changed so as to make them efficacious.

The Secretary reported the appearance of smallpox in Sierra City and Sierra Valley; also one case in North Bloomfield, Nevada County; one in Redding, Shasta County; one in Cloverdale, one in Healdsburg, two in Olema, Marin County; one in Lake County, two in Stockton, two in Solano County, several in Oakland, and eighty-six in San Francisco, up to January 1, 1888.

A communication was read from Governor Waterman, authorizing the Board to adopt whatever means were necessary to arrest the spread of contagious disease, which, on motion, was read and placed on file.

Dr. Cluness moved, which was seconded by Dr. Brice land, that in view of the prevalence of smallpox, the Secretary be instructed to communicate with the Supervisors of every county throughout the State, and urge upon them the necessity of establishing local Boards of Health in their districts and instruct them as to the best methods of preventing smallpox, by forwarding to them official circular pamphlets appertaining to the disease, and issued by the Board; which was unanimously carried.

A communication from the Health Department of San Francisco, requesting the appointment of Inspectors, being the next subject under discussion, the question arose as to the benefit to be derived by appointing Inspectors, the disease being already in the State. Dr. R. B. Cole was of the opinion that we could not arrest the spread of smallpox by inspecting trains, as persons afflicted, but on whose person the disease had not shown any outward signs, could not be detected in the short time consumed in traveling from San Francisco to any part of the State, and therefore was opposed to placing Inspectors on the trains.

Dr. Cluness differed from Dr. Cole. He thought the effect would be good; in the first place, by giving confidence to the public that every precaution was taken to insure their safe travel, and again, it would prevent the travel of any with the disease broken out on them. If such attempted to travel, as we know they do, and without any inspection of the trains, such sources of contagion might be allowed to infect every susceptible person on the train without hindrance. Therefore, as a measure of precaution, and for the moral effect it would have upon the traveling public, he would move that an Inspector be appointed for Tulare, San Pedro, Santa Barbara, San Diego, and Truckee, which, being ably seconded by Dr. J. M. Brice land in a convincing speech, was carried; Dr. Cole voting "No."

Dr. Cluness thought that these Inspectors should be requested to impress upon the community among whom they were placed the fact that vaccination and revaccination alone can be relied upon for protection against smallpox, and that they cooperate with the local authorities in the endeavor to prevent the advent or the spread of the disease.

It was moved by Dr. R. B. Cole, and seconded by Dr. Cluness, that the Inspectors be paid a salary not exceeding \$100 a month, which, after some discussion, was carried.

It was moved by Dr. R. B. Cole that the Secretary be authorized to supply the representatives of this Board with bovine virus without charge, and also local Boards of Health, upon evidence of their inability to furnish the same at their own expense, which was carried.

When upon the subject of the reliability of virus, Dr. Cluness desired to say that, in his opinion, the utility of bovine was much exaggerated; that

he did not believe one third of the virus used had any protective power whatever, and that not one quarter of those vaccinated took; whereas ninety-nine out of one hundred vaccinated with fresh humanized virus gave the characteristic result in a perfect vesicle. He did not believe that humanized lymph, taken on the eighth day and before inflammatory products had appeared, was capable of producing any disease in the human body; and, for himself, would just as soon be vaccinated with the lymph taken from a patient the victim of leprosy as any other, provided it was taken when in the proper stage and manner. He strongly advocated the use of humanized lymph in preference to bovine, when possible to procure it.

The assertion of Dr. Cluness gave rise to quite an animated discussion on the merits and demerits of bovine virus, the majority being inclined to prefer the bovine when reliable, although agreeing that it was not so successful in producing the characteristic vesicle as humanized virus in as many cases operated upon.

Dr. R. B. Cole moved that the Secretary be authorized to communicate with the Representatives of California in Washington, and that they urge the passage of the bill prepared by this Board to establish a quarantine station in the Bay of San Francisco, and that his Excellency Governor Waterman be requested to send a communication indorsing the same to our Senators and Congressmen, which was carried.

There being no further business, on motion of Dr. Briceland, the meeting adjourned.

GERRARD G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH,

Was held in the office of the Secretary, April 16, 1888.

Present—Dr. Orme, President; Dr. Tyrrell, Secretary; Dr. Briceland, Dr. Cluness, Dr. C. A. Ruggles.

The minutes of the last meeting having been read and approved, Dr. C. A. Ruggles, appointed to fill the vacancy caused by the expiration of the term of office of Dr. H. C. Crowder, presented his credentials and was welcomed to a seat at the Board.

Dr. H. S. Orme, Dr. W. R. Cluness, and Dr. J. M. Briceland, having been reappointed members of the Board, vice themselves, presented their qualifications and took their seats.

The Board then reorganized by electing Dr. W. R. Cluness, President pro tem., and Dr. Tyrrell, Secretary pro tem.

Dr. Briceland nominated Dr. H. S. Orme as President of the Board, which was seconded by Dr. C. A. Ruggles, and he was unanimously reelected.

Dr. C. A. Ruggles nominated Dr. G. G. Tyrrell as Secretary of the Board, and he was unanimously reelected.

The following committees were then appointed, subject to such changes as may be deemed necessary hereafter:

1. On the Salubrity of Public Institutions, Schools, Hospitals, Prisons, Factories, etc.—Doctors Cole, Orme, and Simpson.
2. On Statistics relating to Life and Health, Modes of Employment, and of Living, and the Comparative Healthfulness of different localities—Doctors Cluness, Briceland, and Tyrrell.
3. On Intoxicating Liquors, Inebriate Asylums, Pathological Influence of Alcohol, etc.—Doctors Simpson, Cole, and Ruggles.
4. On Influence of Irrigation, Tree Planting, etc.—Doctors Ruggles, Orme, and Cluness.
5. On Legislative Business—Doctors Briceland, Orme, and Tyrrell.

On these committees the Secretary of the Board is ex officio a member. The Secretary reported that he had notified the Supervisors of every county in the State of the necessity that existed for the establishment of local Boards of Health and Health Officers, and had sent them circulars of instruction for that purpose.

On motion, the action of the Secretary was approved.

The Secretary also reported that in accordance with instructions, Inspectors had been appointed in San Diego, San Pedro, Santa Barbara, and Tulare, with orders to inspect all steamers and trains going south, to guard as far as possible against the transportation of smallpox by either. An Inspector was not appointed for Truckee, as the county authorities had appointed Hon. G. W. Griffin, of that place, for similar purpose. The Inspectors were paid \$100 per month, and employed until March first, when the necessity for their appointment having ceased, they were relieved from duty until further orders, by order of the President.

On motion, the action of the President and Secretary was approved.

The Secretary reported that he had supplied the Inspectors with bovine virus to the extent of \$164 worth, which action, on motion, was approved.

The Secretary reported that he had issued a circular letter to the members of Congress in both houses regarding the quarantine bill introduced by Senator Stanford, and had received very favorable replies from many.

A communication was read from Dr. Edwards, of Philadelphia, asking our Board for its support in the publication of the "Annals of Hygiene."

On motion of Dr. Briceland, the Secretary was instructed to subscribe for seven copies of the "Annals" for one year.

A communication was received from the New Hampshire State Board of Health, asking the support of our Board by instructing our Representatives in Congress to favor the formation of a Bureau of Health.

On motion, the communication was received and placed on file for further consideration.

On motion—

Resolved, That the thanks of this Board be returned to our Representatives in Congress for their earnest efforts in behalf of this coast in the advocacy of the bill in relation to quarantine, introduced by Senator Stanford and drawn by this Board.

Which was carried.

Communication was received from Mr. Rudolph Hering, which was ordered placed on file, and the Secretary requested to ask a report upon the subject of sewerage for our biennial report, especially in relation to the City of Los Angeles, upon which Mr. Hering has already made a survey.

Dr. H. Dubois, of San Rafael, sent a communication asking the cooperation of the Board in the establishing of a reliable vaccine station in San Rafael.

Dr. C. A. Ruggles stated that in his experience, where he required quick and sure work, he relied upon humanized virus above all others. With bovine virus his failures amounted to over 35 per cent; whereas, with the humanized lymph, the failures were not even 10 per cent. He believed that sometimes bovine virus was not pure, being not unfrequently mixed with blood, and perhaps other extraneous matters. As far as the San Rafael virus is concerned he had tried it, but found it failed every time.

On motion of Dr. Cluness, it was—

Resolved, That the Pacific Coast Vaccine Station should be encouraged, and toward that end the members of this Board promise to give it a fair and impartial trial.

Which, after some discussion, was carried.

The Secretary read a communication which he had forwarded to the

"Sanitary News," giving a summary of the work of the Board up to the present time, which, on motion, was approved.

At the last meeting of the Board, the Secretary, Drs. Cole and Cluness were appointed a committee to prepare questions to be submitted to the National Conference of State Boards of Health, for consideration. In accordance therewith, the following questions were prepared and sent as proposed by the State Board of California:

a. Cannot a plan be devised to insure uniformity and increase of power in State Boards of Health by formulating, in conference, a draft of the extent of the increased powers desired in matters of quarantine, compulsory notification of contagious diseases, and other sanitary matters within each State, neglected or refused by local Boards, which formula may be expressed in a bill and laid before each State Legislature for passage?

b. What are the true characteristics of the vesicle in successful vaccination from bovine virus?

c. Can the cholera be communicated in any other manner than through the alimentary canal?

d. In the event of cholera reaching America, can it be prevented from becoming epidemic? If so, how?

Which, on motion, were approved as the action of the Board.

The Secretary read reports from the State Boards of Iowa, North Carolina, Illinois, Pennsylvania, Minnesota, Missouri, New York, Tennessee, Louisiana, Kansas, Wisconsin, and Massachusetts, announcing the appearance of smallpox in each of these States, which were ordered on file.

Dr. H. S. Orme, President of the Board, reported that he had officially visited Santa Barbara, Ventura, San Bernardino, and San Diego, for the purpose of giving such instructions as were needed to limit the extension of smallpox in these counties, and to advise with the local authorities as to their duties in providing for the quarantine of the sick and the protection of the people from contagion.

The Secretary reported that he had made official visits to Calaveras County and Watsonville, at the request of the authorities, to determine the nature of the diseases that prevailed in these sections of the country, and to give such advice as might be needed to quiet apprehension and arrest the progress of the maladies.

The actions of the President and Secretary were, on motion, approved.

Matters in relation to quarantine on the coast being under discussion, it was, on motion—

Resolved, That this Board do now adjourn to San Francisco, and invite the Board of Health of San Francisco to meet us in reference to coast quarantine, and the best means to be adopted to restrain the importation of smallpox through the Chinese immigration, both by sea and land.

Which was carried, and the meeting adjourned to meet in Dr. Simpson's office, Post Street, San Francisco, at 8:30 P. M., on April 17, 1888.

ADJOURNED MEETING OF THE STATE BOARD OF HEALTH,

Was held in the office of Dr. Jas. Simpson, April 17, 1888, at 8:30 P. M.

Present—Dr. H. S. Orme, Dr. G. G. Tyrrell, Dr. C. A. Ruggles, Dr. J. M. Briceland, Dr. R. B. Cole, Dr. Jas. Simpson, members of the State Board of Health, and Mayor Pond, Dr. Perry, Dr. McCarthy, Dr. Rosenstirn, of San Francisco Board of Health, and Dr. Barger, Health Officer of San Francisco.

A communication was read from the Board of Health of San Francisco tendering the use of the rooms of the Board of Health in the City Hall to the State Board whenever it decided to transact any of its business in

San Francisco, which, on motion, was received, placed on file, and the thanks of the Board returned to Mayor Pond and Board of Health.

Mayor Pond related his interview with Congressman W. W. Morrow, and was informed that the bill upon quarantine had been referred to the committee whose function it was to select such bills as were deemed most important to be acted upon. The bill was placed upon file for action, and Mr. Morrow was of the opinion that the bill will be brought up for consideration in a few weeks, with great probability of its passage by the House, and then he thinks there will be no trouble in getting it through the Senate.

Dr. R. B. Cole inquired if the number of bills ahead of the quarantine bill would not obstruct its passage.

The Mayor thought they would not, as Mr. Morrow was very energetic and would have the bill pushed to the front.

The Secretary then read for the gentlemen present the action of the State Board and the question proposed for the action of the Conference of State Boards of Health, as well as those proposed by other State Boards, in reference to quarantine, which were deemed important.

Dr. Simpson, in expressing his views upon the subject, was of the opinion that the State Board of Health should be represented at the meeting of the Conference, as it was most important that the urgency of a proper and efficient quarantine should be ably presented to the Conference.

Dr. R. Beverly Cole, recognizing the importance of having the State represented, inquired if there were no possible means of having ourselves represented.

The Secretary replied that the funds appropriated for the expenses of the Board were almost exhausted, and that not enough remained to send a delegate to Cincinnati and pay the current expenses of the Board.

Dr. R. B. Cole moved that—

WHEREAS, The regular appropriation for the use of the State Board of Health being insufficient to justify said Board in sending a representative or delegate to the National Conference of State Boards of Health, at their meeting in Cincinnati, May 4, 1888; be it

Resolved, That the Secretary be instructed to represent to the Governor the importance of this question, especially in the suppression of contagious and infectious diseases, in which this State is so deeply interested, and to request as the action of this Board, that he consent to the appropriation of a sufficient amount of the contagious disease fund to meet the actual expenses of sending a representative of this Board as a delegate to the National Conference of State Boards of Health, to be held in Cincinnati, May 4, 1888.

Dr. Briceland, while in perfect accord with the spirit of the motion, and fully impressed with the desirability of our Board being represented in matters of such vital importance to the State, was very doubtful of the manner in which our Legislature would view our action. It is a very hard matter to convince the modern legislator that money ought to be appropriated for such purpose. When we seek for a continuance of the appropriation next winter, we should have no record that could in any manner prejudice the Legislature against us.

Dr. Rosenstirn, of San Francisco Board of Health, remarked that this subject is not only important in regard to this State, but of national importance, and comes right under the very head for which this money was appropriated, for certainly the prevention of disease coming to the coast was the main object for which this money was designed. This Conference meets for discussing the best means whereby disease may be prevented, and without coöperation we will accomplish but little.

Dr. R. B. Cole could not see the application of Dr. Briceland's remarks; the principal object we have is to inform ourselves as to the best means to be adopted to suppress epidemic diseases, and except we ascertain and interchange views upon the subject we cannot possibly act with that degree

of knowledge which is required of us; he thought it quite within the province of our duty to get all the information possible, and considered the use of the money appropriated for that purpose would be legitimately and correctly used in having ourselves represented at the Conference.

Dr. Jas. Simpson thought that Dr. Briceland spoke as a legislator, and was quite right in his remarks so far, but the progress of science was now so far advanced that the legislator could not but see that the importance of the subject demanded the utmost vigilance, and that we should use every means at our command to be thoroughly equipped against the invasion of pestilence to our shores.

Mayor Pond having at this time to retire, begged to assure the State Board of Health that the City Board would gladly coöperate with it in any means that might be desired to arrest the influx of disease from China, South America, Japan, or Mexico, and begged to assure the State Board that he was in perfect accord with it, and would be glad to have it use his offices whenever assembled for discussion of sanitary business.

Dr. Briceland was sorry to think Dr. Cole was at variance with his views, but when they come in contact with the average legislator, he would find it quite different. It is important that we should make plain our motives under which we act, as we must have another appropriation; it has become a necessity, and if we do anything to antagonize the Legislature, we will get nothing. He, as said before, was in full accord with the resolution, but begged we would do nothing that could place us in a false position before the Legislature.

Dr. Perry, of San Francisco Board of Health, agreed with Dr. Briceland, and did not know what we would accomplish by sending a delegate to the Conference, except by informing it what we might have to say upon Chinese immigration, especially in regard to smallpox and vaccination. It is a fact that Chinese land upon our shores with large scabs upon their arms, and yet they are not vaccinated, because, as the ship's surgeon says, that when they vaccinate them, the Chinese suck the wound, and then rub in some irritating substance that swells their arms, but does not protect them, producing, instead of a vesicle, an irritant sore that scabs over and fosters the deception of being successfully vaccinated. We might tell the Conference something of which they were now ignorant, but could learn nothing from them.

Dr. Rosenstirn, San Francisco Board of Health, thought that if Dr. Perry had spoken in favor of sending a delegate instead of against that proposition, he could not have spoken more favorably. The object of the Conference is for discussion of contagious diseases, and that we could give a deal of information upon this subject by attending is admitted by Dr. Perry in his remarks.

Dr. Simpson had only a word or two to say: Dr. Perry will admit that we have difficulties in regard to quarantine unknown to other States, and by letting them know our condition we would gain their support in all matters appertaining to the exclusion of disease. We ought, without doubt, be represented at that National Conference.

Dr. Orme agreed with Dr. Simpson, that we ought to have a representative there, and thought we ought to have two delegates at the Conference, as it was of vital importance to this State that our views be fully explained and the difficulties under which we labor in our isolated condition be fully set forth.

Dr. C. A. Ruggles thought there could be no doubt of the importance of this question, and was of the opinion that a delegate would by consulta-

tion gain more information than by any other means. The question for us to decide is, will the Governor consent to appropriate any diversion of this fund for this purpose? He was decidedly in favor of it, and thought that when explained to the Governor, there would be no difficulty in obtaining his consent, as it was to be used in the cause for which it was designed.

Dr. Barger, Health Officer of San Francisco, would like to ask, for information, the wording of the Act, which being recounted by the Secretary, Dr. Tyrrell, Dr. Barger said he could not see where the diversion spoken of by Dr. Ruggles came in, as he thought the Act contemplated we should use this money for the prevention of contagious disease, which is now what your Board designs to do.

The question being called for, a vote was taken, when the motion was carried unanimously.

Dr. Perry, of the San Francisco Board of Health, asked leave to introduce the following resolution:

Resolved, That a committee of two be appointed from the State Board of Health and from the San Francisco Board of Health to agree upon sanitary measures affecting both the State at large and the city of San Francisco, to be urged for passage before the next Legislature. This committee to report at a conference of both Boards.

Leave being granted, the resolutions were offered and carried unanimously.

The Secretary read a letter from the Health Officer of San Francisco, announcing the arrival of the steamer "Parthia," and her detention in quarantine, and informed our Board that her cabin passengers had escaped quarantine by leaving the steamer at Vancouver, British Columbia, and, being refused passage by sea via the Goodall, Perkins & Company's line of steamers, crossed the continent by the Northern Pacific Railroad.

The Secretary was instructed to take whatever steps he deemed necessary to protect California from this new inroad of infectious disease through the Oregon Railroad, and notify the officers of the company of the dangers which threatened their passenger traffic through this means. The communication was ordered on file.

A vote of thanks was passed to his Honor Mayor Pond and the San Francisco Board of Health, for their attendance and deliberations in the business of the Board.

Drs. Cole and Simpson were appointed the committee to consult with a like committee from the San Francisco Board of Health on legislative matters.

After quite an animated discussion upon the proper means of quarantining smallpox, indulged in by Dr. Ruggles, Dr. Simpson, Dr. Cole, and Dr. Bayer, on motion, the meeting adjourned.

GERRARD G. TYRRELL,
Secretary.

REPORT OF THE PERMANENT SECRETARY.

To the State Board of Health :

GENTLEMEN: In presenting this the tenth biennial report of the State Board of Health, your Secretary is glad to be able to congratulate the Board upon the advances it has made in the direction of inculcating the great principles of sanitary science in the public mind. So satisfied are we of the increase in the belief that the restriction or prevention of epidemic disease is not beyond the power of human intelligence, properly directed, that sanitary legislation in the coming session may be looked for with some degree of confidence in obtaining the passage of such laws as will make the sanitary government of this State equally as much a matter of vital necessity as the civil government itself.

Within the past two years nearly all the States in this Union have established State Boards of Health, and with these this Board is in close communion. Through the conference of these Boards we have adopted certain regulations whereby we each notify the other of the appearance of any epidemic, contagious, or infectious diseases, thus putting each State upon its guard to watch the progress of communicable affections, and take such precautionary measures that upon the very threshold of their march we can, by sanitary vigilance, stop them. Through the circulars and publications of your Board, an interest has been awakened in the public mind regarding the prevention of disease and the wonderful possibilities that lie in sanitary precaution and reform, which in no other way could be brought so directly under its notice. We find its fruits in the desire to establish local Boards of Health; in the abandonment of polluted water supplies; in the sewerage of towns hitherto without drainage; in the destruction of garbage by burial or by fire; in the building of school houses properly warmed and ventilated; in the teaching of hygiene in schools and colleges, and in the general belief now dawning upon the public mind that cleanliness is next to godliness, and that disease and death follow closely in the wake of debauchery and dirt.

An efficient co-worker with our Board has been the press, and to its most powerful aid may be ascribed the dissemination of sanitary truths within our borders, and by its great influence we have been enabled to procure some legislation of incalculable value to the welfare of California. Our correspondents have with almost unfailing regularity transmitted their monthly records, whereby we were enabled to give a tolerably fair estimate of the general healthfulness of the State during the past two years. The mortality statistics, we regret to say, are not by any means complete, neither can they possibly be under the present law relating to births, marriages, and deaths. The cities and towns reporting deaths as a general rule report only those deaths within their limits, a few including those in the immediate vicinity.

Many deaths occur within a short distance, and are seldom reported, and very many more occur throughout the State of which this office hears nothing. This is a condition of affairs that should not be permitted to exist in any State or community professing to be in the van of civilization. Correct vital statistics are as necessary to the well being of a State as they are to a

community. By them we can form some idea of sickness and mortality, with reference to the causes, and the comparative prevalence in localities, as well as the death rate. Again they afford a reliable record of certain events, which are often essential to be proved in establishing the right to property or its distribution, and not infrequently are they a reliable aid in the detection of crime. Within but a short time we have had the mortification of confessing to applicants for information relative to deceased persons the inability of our office to furnish the requisite legal knowledge required, no records being kept by the County Recorders, as required by law, no data being furnished them by physicians or others. This can only be rectified by making the recording of deaths compulsory, under a heavy fine or imprisonment; otherwise the law will be as now, completely ignored.

LEGISLATION.

An attempt was made before the Legislature of 1884 to have the law so changed that a correct registration might be possible. It was unfortunately never brought to a test vote. Accordingly, at the session of 1886, the following bill was introduced by Senator Briceland, and known as Senate Bill No. 113, with a view to amending the Political Code relative to the registry of births, marriages, and deaths:

AN ACT

To amend sections three thousand and seventy-seven, three thousand and seventy-eight, three thousand and eighty, and three thousand and eighty-two of an Act entitled "An Act to establish a Political Code," approved March twelfth, eighteen hundred and seventy-two, relative to the registry of births, deaths, and marriages.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and seventy-seven of said Act to establish a Political Code is amended so as to read as follows:

Section 3077. All persons registering marriages, births, or deaths, must, at the close of every calendar month, file with the County Recorder a certified copy of their register. Each certificate must certify, as nearly as may be ascertained, the name in full, age, occupation, term of residence, in the city or county, birthplace, condition, whether single or married, widow or widower, sex, race, color, last place of residence, and also, when of accidents, the cause of death; and, also, when of births, the sex and color of the child, and name and nativity of its parents. Each person filing such copy is entitled to a compensation of twenty-five cents for each birth, marriage, or death so recorded, and the Recorder must give a certificate of such filing to the person entitled thereto, stating the number of deaths, marriages, or births recorded, and the amount due therefor. Upon the presentation of the Recorder's certificate to the County Auditor, he must deliver, at once, without any order of the Board of Supervisors, a warrant for the sum due, payable out of the General Fund of the County Treasury, and the County Treasurer is directed to pay the same. The Auditor must report the amount of warrants so drawn each month to the Board of Supervisors.

SEC. 2. Section three thousand and seventy-eight of said Act entitled an Act to establish a Political Code is amended so as to read as follows:

Section 3078. If, at any birth, there is no attending physician or midwife, the parents must make the report, and are entitled to the same compensation prescribed in the preceding section.

SEC. 3. Section three thousand and eighty of said Act to establish a Political Code is amended so as to read as follows:

Section 3080. The County Recorder, at the close of each month, must transmit to the Secretary of the State Board of Health, at Sacramento City, a certified abstract of the register of births, marriages, and deaths, prepared in the manner prescribed by the Secretary, and upon blanks furnished by him.

SEC. 4. Section three thousand and eighty-two of the Act to establish a Political Code is amended so as to read as follows:

Section 3082. Any person on whom a duty is imposed by this chapter, who fails, neglects, or refuses to perform the same, is liable to a penalty of fifty dollars and costs of suit for each offense, to be recovered in an action by the District Attorney of the proper county; one half of the penalty to be retained by him for his services, and the remainder to be paid into the General Fund of the county. The Secretary of the State Board of Health and the County Recorder must inform the District Attorney of any neglect of duty as prescribed in this chapter.

SEC. 5. This Act takes effect thirty days after its passage.

The bill was referred to the Committee on Hospitals, reported back with a recommendation for passage, and reached its second reading. Further than this it never got, although Dr. Briceland did his best to get this bill called up and passed. The passage of this bill would have required the registration of births, marriages, and deaths every month, and the compensation of those registering. It had also the good feature of throwing the onus of prosecution upon the State Board of Health in case of failure or neglect to register, and compelling the District Attorney to enter suit against the delinquent.

At the time this bill was introduced Senator Briceland also introduced Senate Bill No. 114, which read as follows:

AN ACT

To amend section three hundred and seventy-eight of an Act entitled an Act to establish a Penal Code, approved February fourteenth, eighteen hundred and seventy-two, relating to the preservation of the public health and safety and registration of births, deaths, and marriages.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three hundred and seventy-eight of the Act entitled an Act to establish a Penal Code, approved February fourteenth, eighteen hundred and seventy-two, is amended so as to read as follows:

Section 378. Every person charged with the performance of any duty under the law relating to the public health, and every person charged with the duty of keeping a register of births, marriages, or deaths, and every Recorder, or other person, whose duty it is to report to the State Board of Health, who willfully neglects, or refuses to perform the same, and every person who willfully refuses to obey the rules and regulations passed by any Board of Health, or health officer having the powers of a Board of Health, is guilty of a misdemeanor.

This Act if it had passed would have brought the registration of births, marriages, and deaths under the operation of the Penal Code, and consequently increased our powers of compelling the observance of the law. It reached a second reading, but no further, as it was impossible to convince enough of the Senators that such a bill would have added to the welfare of the State or their own glory.

It was evident that no bill affecting the registration of births, marriages, and deaths could obtain passage among such a body of men, as they had no idea that such a subject was of any importance, or worthy of their serious consideration, or, as one intelligent Senator said, "Oh, confound it, when a man is dead, what is the use of bothering any more about him; who cares what becomes of him or whether he is registered or not?" This is a specimen of the mentality our Board had to contend with in its efforts to serve the State and improve its health laws.

It was now thought that a registry of deaths might be obtained if we could succeed in passing a law requiring the issuance of a permit before the burial or cremation of any human body could take place. Accordingly, Senate Bill No. 111 was prepared and introduced by Senator Briceland, as follows:

AN ACT

To amend section three thousand and eighty-four of an Act entitled "An Act to establish a Political Code," approved March twelfth, eighteen hundred and seventy-two, relative to the interment or cremation of human bodies.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and eighty-four of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, is hereby amended so as to read as follows:

Section 3084. No person shall inter, cremate, or otherwise dispose of any human body, in any city, county, or city and county, without having first obtained a permit. In incorporated cities, or counties, or cities and counties, the permit must be obtained from the person authorized to grant the same by any law, ordinance, or resolution passed for that

purpose. But in the absence of such law, ordinance, or resolution, the permit must be obtained from either the Coroner, or Health Officer, Board of Health, or if the Coroner be absent, then from the Health Officer or Board of Health; and if there be no Board of Health or Health Officer, then from a Justice of the Peace. The person applying for a permit must produce and file with the officer issuing the permit a certificate signed by a physician, or a Coroner, or two reputable citizens, setting forth as near as possible the name, age, color, place of birth, occupation, date, locality, and cause of death of deceased. And no permit shall be granted without the production of such certificate. Such permit must be filed with the County Recorder, and the person so filing is entitled to the compensation provided for in section three thousand and seventy-seven of this Code, but if any other registration of the death of the decedent shall have been made, the Recorder must record the name but once.

SEC. 2. This Act takes effect thirty days after its passage.

This, like the other bills, was referred to the Committee on Hospitals, and recommended for passage.

It reached its second reading, but was opposed from going further upon the grounds that it was putting the citizen to unnecessary trouble, and that in outside districts it might not be within the power of the friends to get such a permit, and that no right could exist to abridge the liberty of the citizen in burying his dead when he pleased. According to this kind of reasoning the bill was not given a third reading, and was buried without further ceremony.

Under the present law, as you are aware, relating to the registration of deaths, births, and marriages, it is defined who are to keep registers, and for their neglect to do so are liable, upon action of the District Attorney, to a fine of \$50; but as no person ever heard of a prosecution by any District Attorney within the State, the law was disregarded and wholly inoperative. To take this matter into the Penal Code, where punishment might be meted out to offenders, Senator Briceland introduced Senate Bill No. 110, as follows:

AN ACT

To amend section three hundred and seventy-seven of an Act entitled an Act to establish a Penal Code, approved February fourteenth, eighteen hundred and seventy-two, relating to the disposal of human dead bodies, and preservation of the public health.

SECTION 1. Section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February fourteenth, eighteen hundred and seventy-two, is amended so as to read as follows:

Section 377. Every person who is charged with a duty relating to the registration of deaths under Chapter III, Title VII, of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, who—

1. Willfully fails to keep a registry of the name, age, residence, and time of death, of a decedent; or,
2. Willfully fails to register with the County Recorder a certified copy of such register, as is provided for in said chapter; or,
3. Willfully inter, cremates, or otherwise disposes of any human body, in any city, county, or city and country, without having first obtained a permit, as provided for in said chapter; or,
4. Willfully grants a permit for the interment, cremation, or disposition of a dead human body, without the certificate provided for in said chapter; or,
5. Willfully violates any of the laws of this State relating to the preservation of the public health;

Is guilty of a misdemeanor, and is, unless a different punishment for such violation is prescribed by this Code, punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding one thousand dollars, or by both such fine and imprisonment.

This bill was referred to the Committee on Hospitals and recommended for passage; it reached a first reading, was placed on the file, and there it remained beyond resurrection. We now endeavored to improve the laws relating to

LOCAL BOARDS OF HEALTH.

The State Board of Health, among other duties, is required to place itself in communication with local Boards of Health. In order to do that Sec-

tion 3061 of the Political Code says: "It shall be the duty of the Board of Trustees, Council, or other corresponding Board of every incorporated town and city of this State, to establish by ordinance a Board of Health for such town or city to consist of five persons," etc. This law, we regret to say, has not been obeyed in the manner contemplated by its originator, only twenty-six incorporated towns having local Boards of Health out of the sixty-three that should have them. As the establishment of local Boards of Health in every town is of the utmost importance as a district sanitary authority to which the people could look for protection from, and the preventive management of, dangerous contagious diseases, we endeavored to make the law mandatory, so that in each unincorporated town of five hundred or more inhabitants there must be appointed at least a Health Officer, who should have all the power of a Board of Health, and that in incorporated cities where the City Trustees, or other officers, failed to organize a Board of Health, the power should be delegated to the State Board to have such Board organized according to law. The object of the new law was to get the whole State under complete sanitary organization, so that our Board would have a network of communication through which we could keep thoroughly apprised of the condition of the public health and be enabled to take such means to prevent the spread of epidemics, that contagious diseases could make no headway. With this in view the following bill, No. 112, was introduced in the Senate:

AN ACT

To amend section three thousand and sixty-two of, and to add a new section to, an Act entitled "An Act to establish a Political Code," approved March twelfth, eighteen hundred and seventy-two, relating to Boards of Health.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and sixty-two of said Act to establish a Political Code is amended so as to read as follows:

3062. The Board of Supervisors of each county must appoint, in each unincorporated city or town of five hundred or more inhabitants, a Health Officer, who has all the duties and powers of the Board of Health and Health Officer, as specified in this and the two preceding articles.

Sec. 2. There is added to said Code a new section, to be called section three thousand and sixty-four, which shall read as follows:

Section 3064. The Board of Supervisors must fix the salary or compensation of Boards of Health or Health Officer, and provide for the expenses of enforcing the provisions of this article. If the Board of Supervisors or Board of Trustees, Council, or other corresponding Board of any incorporated town neglects to provide a Board of Health or Health Officer by the first day of July, eighteen hundred and eighty-seven, the State Board of Health may direct the District Attorney of the county to begin an action against such Board of Supervisors, or Board of Trustees, or corresponding Board, to compel the performance of their duty, or may appoint a Board of Health or Health Officer, with the powers of a Board of Health, for such town or city, and the expenses of such Board of Health or Health Officer shall be a charge against the incorporated city or town for which such appointment shall be made, and when the appointment is made for unincorporated towns the expenses of the Board of Health or Health Officer is a charge against the county.

This bill was referred to the Committee on Hospitals and reported favorably, was placed on file and reached its second reading, thence it fell into "innocuous desuetude," and never was heard of more during the session. From our utter failure to amend the law relating to Boards of Health, our State is in a very precarious position should any severe epidemic disease become general, as we are without proper organization or the necessary discipline to enter into a combat with such a foe. At the coming session of the Legislature our co-member and Senator proposes to make another attempt to get this or a similar bill before the Senate, so that order may be restored from chaos.

VACCINATION.

In times of immunity from epidemics of smallpox the practice of vaccination is neglected, hence in a few years there is accumulated in the State a vast array of unvaccinated persons who fall ready victims to the malady when it reappears from any cause. To endeavor to make the practice general and protect us from the ravages of smallpox, we had the following Act introduced into the Senate by our fellow member, Dr. Briceland:

AN ACT

To encourage and provide for a general vaccination in the State of California.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Trustees of the several common school districts in this State, and Boards of common school government in the several cities and towns, are directed to exclude from the benefits of the common schools therein any child or any person who has not been vaccinated, until such time when said child or person shall be successfully vaccinated.

SEC. 2. The Trustees, or local Boards, annually, or at such special times to be stated by the State Board of Health, must give at least ten days' notice, by posting a notice in two or more public or conspicuous places within their jurisdiction, that provision has been made for the vaccination of any child of suitable age who may desire to attend the common schools, and whose parents or guardians are pecuniarily or otherwise unable to procure vaccination for such child.

SEC. 3. The said Trustees or Board must immediately after the passage of this Act, and every year thereafter, appoint some competent physician and fix the compensation for his services, the duty of which physician shall be to ascertain the number of children or persons in the school district, or subdivision of city school government, being of age suitable to attend the common school, who have not been already vaccinated, and also to furnish to the said Trustees or said Board a list of the names of all such children or persons. It shall also be the duty of said physician to provide himself with good and reliable vaccine virus wherewith to vaccinate such of the number of children or persons aforesaid as have not been vaccinated according as the Trustees or Board shall direct, and to thereupon give certificates of vaccination when said physician has, by personal examination, assured himself of the success of the vaccination, which certificates shall be evidence thereof for the purpose of a compliance with section first hereof.

SEC. 4. The necessary expenses incurred by the provisions of this Act shall be paid out of the common school moneys apportioned to the district, city, or town, and if there be not sufficient money, the Trustees must notify the Board of Supervisors of the amount of money necessary, and the Board must, at the time of levying the county tax, levy a tax upon the taxable property in the district sufficient to raise the amount needed. The rate of taxation is ascertained by deducting fifteen per cent for delinquencies from the assessment, and the rate must be based upon the remainder. The tax so levied shall be computed and entered upon the assessment roll by the County Auditor, and collected at the same time and in the same manner as State and county taxes, and when collected shall be paid into the County Treasury for the use of the district.

SEC. 5. The Trustees of the several school districts of this State are hereby required to include in their annual report, and report to the Secretary of the State Board of Health, the number in their several districts between the ages of five and twenty-one years who are vaccinated, and the number unvaccinated.

SEC. 6. This Act shall take effect immediately.

We had hoped by the passage of this bill to insure the vaccination of the rising generation, and by making it general in its application, that no opposition would arise to defeat it. It was referred to the Committee on Hospitals, and reported back favorably, with a recommendation for passage. It was read a first and second time, and placed on file. When it was called a third time for passage, one of the learned Senators from San Francisco, of whom we were taught to expect better things, moved that "the enacting clause be stricken out," as he afterwards said, "he was not going to have any man's child kept out of school because it was not vaccinated." As this man was a political wirepuller, with great influence in his delegation, the enacting clause was stricken out, and the bill was then and there effectually strangled. This has been the history of our attempts at improving the health laws of California, of our desire to have enacted such measures as would add to the safety and welfare of the people. Upon every occasion

we were ignominiously defeated, through the ignorance or design of those who were elected by the people to serve their interests. Happily, at this time, smallpox was imported into the State from Mexico. It soon began to inspire fear of its extension among the constituents of our Senators and Assemblymen, and, like the sinners of old, they cried, "What shall we do to be saved?" Smallpox was epidemic in Mexico; it had crossed our border and was now traveling north. Your Board had no funds with which to take any preventive measures, and your Governor had no means at his command. In this emergency, although irritated by former incomprehensible defeats, Senator Briceland introduced into the Senate the following bill (No. 431):

AN ACT

To appropriate money to prevent the introduction of contagious and infectious diseases.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The sum of twenty thousand dollars is hereby appropriated out of the General Fund in the State Treasury, to be expended by the State Board of Health, under the direction of the Governor, for the prevention of the introduction of contagious and infectious diseases into the State. The claims for such expenditures must be audited by the Board of Examiners; except that when a contingency arises, which, in the opinion of the Governor, demands the immediate use of money, the Controller may draw his warrant upon the order of the Governor in such sums, not exceeding one thousand dollars, as he may direct in the name of the State Board of Health; *provided*, that an account must thereafter be filed with the Board of Examiners and audited by it and transmitted to the Controller showing the manner of such expenditure.

SEC. 2. This Act takes effect immediately.

This bill seemed to meet with approval, but could not be permitted to be passed without some amendment or other; accordingly, Senator Clunie amended it by inserting \$10,000 instead of \$20,000, to be appropriated for sanitary purposes, and in this shape the bill passed and was signed by the Governor.

The session was now about closed, and no further attempt could be made to increase the usefulness of the State Board of Health. To be sure, we did make an attempt to get \$5,000 for two years for the State Analyst, to enable him to employ an assistant or two, so that we could have the mineral waters of the State analyzed, but the Committee on Appropriations would not consent to place it in the bill, and as a consequence the mineral waters remain unanalyzed, except in those cases undertaken by private enterprise.

The history of legislation for the session of 1886 may be set down as a failure. No law was passed to amend our health laws, and the only substantial gain made was the appropriation of a small sum for emergencies, should such arise. We must reluctantly confess that this speaks very badly for the intelligence of those chosen by the people to make their laws. Where legislation is to be had to preserve hogs from cholera, horses from glanders, cattle from plague, or trees from insects, there is no trouble in getting a respectful hearing of the bill and its speedy passage. But when the State Board of Health, true to its mission of mercy, seeks to amend the laws appertaining to health, so as to prevent the ravages of disease, to prolong by wise sanitary measures the period of existence allotted to man, to preserve human life by the lessening of the opportunities for crime, to prevent the advent of disease by timely measures of precaution and sanitary watchfulness, we are met with the most supreme indifference, or perhaps asked, "How much is there in the bill?" No consideration of the important results involved, no thought of the interest of the State of California in the preservation of its people, or in the establishing of its claim as the world's sanitarium; on the contrary every effort made to improve our sanitary

laws has been looked upon as some attempt upon the part of the "doctors" to obtain some special legislation for their own benefit or aggrandizement, which can be illustrated by the remark of a legislator to the writer, when he said: "Doctor, where is the nigger in that fence? I want a look at him."

Since that time two years have elapsed, during which period your Board, through its Secretary, has published monthly, without a single exception, a circular giving a report of all the deaths received from his private correspondents, the causes, as far as known, and the ages of the decedents; besides this, a list of all the prevailing diseases of each county has been summarized, and deductions drawn therefrom concerning the sanitary condition of the State: in addition, your Secretary thought it prudent each month to introduce some few hints as to sanitation and its necessity. By this means the public has been kept informed of the course of disease, where prevalent, and how to avoid it; it has also been taught that the State has provided a guardian over its vital interests in the form of your Board; it has also learned, we hope, that the welfare of the people, their preservation from disease and death, is its whole object and desire; it has also learned that the power of the State Board of Health is restricted—it has no mandatory power—and in its present helpless condition can only advise.

What we ask from the Legislature is more power to act in the interest of California; when our Board is asked to check an epidemic, we want the power to do it; when a town or city refuses to restrain its people from communicating its infectious disease to its innocent neighbors, we want to be able to compel such town or city to keep its disease at home, and there destroy it; if a county will not establish a Board of Health or a Health Officer, we must have compulsory power to establish such Board, as by such Boards unification of purpose is established, and a cordon of faithful guardsmen of the public weal organized, so that disease cannot spread and human life be thus imperiled.

We sincerely trust that the efforts made by the Board may be so productive of good that our Legislature will see that what we ask has "no nigger in the fence," but is solely and wholly in the interest of the people of California. We have within this State the possibilities of a perfect sanitarium, an embodiment of all that constitutes the perfection of a hygienic home. If we destroy it by neglect, or impair its perfections by sanitary delay, we are alone to blame. Nature has given us climate, soil, and water in perfection; it is our duty to preserve their purity.

QUARANTINE.

The subject of coast quarantine had engaged the attention of your Board for many years, and as you are aware our efforts failed of success. In the early part of 1886, your Board determined to make another effort, as we were continually threatened by an invasion of smallpox, cholera, and yellow fever, by way of China, Mexico, the Sandwich Islands, and Japan. Accordingly the following bill was prepared and forwarded to our Representatives in Washington:

AN ACT

To establish a Quarantine Station at the Port of San Francisco.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled:

THAT, WHEREAS, The Port of San Francisco is peculiarly liable to the incursions of infectious and contagious diseases from South America, Pacific Islands, and Asiatic ports, and it is desirable to establish a well appointed quarantine station thereat;

Now, THEREFORE, There is hereby appropriated out of any money in the Treasury not otherwise appropriated, such sum, not exceeding one hundred thousand dollars, as may be necessary to purchase grounds and erect buildings suitable for quarantine purposes at the port of San Francisco. The same shall be forthwith expended, for the purpose aforesaid, under the direction of the Secretary of the Treasury.

The said quarantine grounds and buildings, when completed, shall be under the supervision of the Marine Hospital service at said port. The use thereof, from time to time, may be granted by the authorities of said Hospital to the Health Departments of the City and County of San Francisco or State of California, upon condition that the said Health Departments, or either of them, assume the expense of maintaining the same.

This bill met with the approval of Senator Leland Stanford, who introduced it and watched its progress through the committee and had it favorably reported. In the meantime your Board had printed sufficient copies of the bill to supply the members of both houses, which were immediately forwarded, one copy to each member, accompanied by the following letter:

CALIFORNIA STATE BOARD OF HEALTH, }
SACRAMENTO, January 23, 1868. }

Hon. ———, Washington, D. C.:

DEAR SIR: At a meeting of the State Board of Health of California, held January fifth, it was unanimously resolved to ask all of our Senators and Representatives in Congress to urge to immediate passage the "Act to establish a quarantine station at San Francisco."

Said bill has already been introduced in the Senate by Senator Stanford, and we now inclose you a copy of the same, and hope, as you are familiar with our necessities at this time, when smallpox has already been introduced into our State from China, and that we will probably be obliged to quarantine against cholera before many months, that you will give this matter the immediate attention which its importance demands.

This bill has the indorsement of the Board of Trade and Commerce in San Francisco, and has been urged and demanded by our State Board of Health since 1860.

I remain, dear sir, yours, respectfully,

GERRARD GEO. TYRRELL,
Secretary.

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To this appeal many very favorable responses were returned, and the Senate passed the bill. When it reached the House, Congressmen W. W. Morrow and C. N. Felton took charge, and by persistent and patient efforts, with the aid of their colleagues, had the bill passed, amended so as to include San Diego. This bill was signed by the President, and now we have the satisfaction of knowing that very soon we will have a quarantine station and quarantine buildings, both in the port of San Diego, as well as in the port of San Francisco. For this boon the State Board of Health may claim no small share, as it has worked persistently, in the face of almost insurmountable obstacles, until the object sought was obtained.

Another source of gratification to this Board is a letter received from Dr. Joseph Holt, the distinguished sanitarian of New Orleans, in which he states that General J. B. Hamilton has assured him that his plan known as the "Holt Plan," or "New Orleans Plan," will substantially be adopted in all the new quarantine stations to be hereafter established. As this plan has been adopted in the Dominion of Canada, from its proven success in New Orleans, your Secretary deemed it of sufficient interest to obtain the permission of Dr. Holt to republish his descriptive history of the practical operations involved in the carrying out of his ideas. Dr. Holt not only gave his cheerful consent, but supplied our Board with the original plates to illustrate the paper, and which your Board will find duly reprinted in this report. The organization of quarantine buildings, supplied with Dr. Holt's apparatus, will practically relieve us of the constant dread of infectious disease reaching our shores by sea. We still have to contend with the positive danger that constantly threatens us inland.

In the early part of the year 1887 smallpox was very prevalent throughout Mexico, and especially along the border towns in communication with

our State. As no precautionary or sanitary measures are observed among the Mexicans in the frontier settlements, the advent of any of them into our State is liable to introduce the germs of the disease, and this is just what did happen in February, 1887, when some Mexicans from over the border attended an entertainment in Los Angeles. In a few days afterwards smallpox developed in that city, a detailed account of which will be found in a paper by your President in another part of the report. Inland quarantine against smallpox was at once instituted by your Board, and Inspectors placed on all trains entering the State and on all vessels arriving by sea from Mexico. We were enabled to do this from the fact that a fund had been provided for such purpose, without which your Board would have been perfectly powerless. Through the vigilance used by our Inspectors not a single case of smallpox was permitted to gain entrance by land, and by the timely efforts of your Board, the disease was quickly subdued by the local authorities in the city where it started.

If our Legislature in its wisdom will continue in force the Contingent Contagious Disease Fund, and increase its amount to at least the original sum asked, we will be enabled to watch our borders more closely, which even now is absolutely necessary, as the increase of travel into this State is acquiring such proportions that our danger of infection from abroad is much increased, and daily increasing. If it should become necessary to establish temporary buildings on the border to disinfect and fumigate goods and passengers arriving from smallpox, cholera, or yellow fever stricken districts, it is beyond question necessary that a sufficient fund be set aside to be used for that purpose. The pittance now in the hands of the Governor, or rather at his disposal, would not begin to place an effective quarantine against yellow fever, which at the present time is epidemic in Florida. To efficiently guard our State against this most dreaded of all diseases, the quarantine must be rigid. We must be prepared to stop all passengers and goods coming from affected districts. We must have means to temporarily lodge the passengers for a period of ten days, and also the means of fumigating and disinfecting both their persons and their goods. To do this we must have temporary structures erected some distance away from the line of travel, with all the appliances necessary to make travelers comfortable during their time of detention. We must have also a temporary hospital for the retention of any that are sick. All this involves a considerable outlay, and will no doubt meet with much opposition from those who do not realize what an epidemic of cholera or yellow fever would cost this State. Better far that any amount of money be expended to preserve us from such a calamity, that would not only kill our inhabitants, but also effectually kill our State as a sanitarium, and take from us our boast that California is the most desirable place of residence in the known world.

There is no necessity to further enlarge upon this need. We must have a contingent fund, under the control of the Governor, for immediate use whenever needed, and it is to be hoped that the incoming Legislature will have sufficient sagacity to recognize the importance of this measure, and have wisdom and forethought enough to make the appropriation so large that preventive measures can at any time be taken, so as to insure our State against the invasion of disease, if it is within the power of intelligent humanity to do it.

Since the publication of our last biennial report, your Secretary has the pleasure of recording that our State has been particularly free from epidemic disease, with the exception of an inroad of smallpox, which never attained to any serious dimensions.

SMALLPOX

First appeared in Los Angeles February 16, 1887. On the nineteenth, ten cases had developed, which were all removed to the smallpox hospital, or carefully isolated at their homes. It was ascertained that all these cases occurring in young men had a common exposure in a variety theater much frequented by Mexicans, and as smallpox was prevalent in Mexico at the time, the presumption was strong that the infection was carried by the clothing of the Mexicans into the closely packed theater, there to produce these results. On the twenty-seventh of February the disease had spread to Lugo settlement, nine miles from Los Angeles, and from day to day reports were received of cases of smallpox here and there throughout the county. A degree of alarm having thus been incited, the State Board of Health deemed it its duty to take some active steps to prevent, if possible, the extension of the disease beyond its present boundaries. Accordingly a special meeting of the Board was held on March 8, 1887, for the purpose of taking into consideration the propriety of quarantining the southern border of the State. We had information that the disease was very prevalent in Sonora, Guaymas, and Mazatlan, in Mexico, all towns in close relation with our State. It was by this time quite prevalent in Los Angeles, and some cases were reported in San Diego County. After due consideration, the Board instructed your Secretary to confer with the railroad authorities, and make such arrangements that a quarantine might be developed at any time the Board deemed necessary. As you are aware, our mission was successful, and resulted in our placing Medical Inspectors at all the points where smallpox would be likely to invade the northern portion of the State. By this means smallpox was confined to the lower counties, and by the first of May we were able to discontinue their services, and by June, 1887, the disease was wholly under control.

In February, 1887, a single case of smallpox appeared in San Francisco. Its origin was not traced. The city remained free from the disease until May third, when a Chinese passenger on the steamer "City of Sydney," from Hongkong, introduced it eight days after deportation from the steamer. In the report kindly furnished by Dr. S. S. Herrick, of San Francisco, a detailed statement is made of the progress of the disease in that city, whereby it will be seen that at no time did it actually develop into a serious epidemic. In the early part of the year your Secretary was instructed to issue a circular calling attention to the necessity of vaccination, together with the means to be used to prevent the spread of the disease. Accordingly twenty thousand copies of the following circular were printed and distributed throughout the State:

FACTS FOR THE PEOPLE CONCERNING SMALLPOX AND VACCINATION.

Smallpox.

After an absence of many years, smallpox has again been imported into our State. The extreme liability of its diffusion through railway intercommunication, and personal contagion, and in view of checking its progress, the State Board of Health feels it its imperative duty to present certain suggestions and precautions, the compliance with which will restore confidence to those who suffer from fear of the disease, and absolute immunity to those in danger of contagion. There are two ways to obtain protection from smallpox. One is by strict quarantine, to completely shut it out, and the other is to anticipate it by a general vaccination. As the first mode is more or less liable to failure, through lack of vigilance on the part of the authorities, or absence of indications of the incubating disease that would warrant detention, it is the more certain plan to vaccinate as well as quarantine, and then we have the disease wholly under command as nearly as human means can do it.

Preventive Measures.

Vaccination is the only preventive measure that is known to successfully avert smallpox. If properly done with reliable virus, whether bovine or humanized, there is nothing more absolutely certain than the fact of the protection of the individual from the fatal effects of smallpox.

The vaccination ought, if possible, to be performed by an educated physician, with lymph that *he knows* to be pure and reliable, and who is perfectly familiar with the typical vesicle produced; or, in other words, who knows that the vaccination has been successful, or taken properly.

There are, however, certain precautions to be taken in the performance of the operation of vaccination, to make the result certain. The State Board of Health cannot too earnestly protest against the careless and unscientific manner in which it is too often performed and the result ascertained. In many, very many, such cases vaccination serves only to deceive, through a false sense of security; much unmerited disparagement is cast upon the value of the operation, and the confidence which its preventive power inspired is rudely shaken when the *supposed* to be vaccinated person is stricken with smallpox. This result is to be doubly deplored; first, on the part of the stricken victim, and again for the fruitful theme for controversy which it suggests to the opponents of vaccination, and which it is often very difficult to combat. To avoid, as much as possible, any such contingency, and to insure the result of a perfect vaccination, the following recommendations are presented for adoption to all vaccinators, as designed to secure and maintain the public confidence in the protective power of vaccination, which is beyond serious question:

First—Except as far as the immediate danger of smallpox may require, vaccinate only subjects that are in good health.

In case of infants, ascertain that there is not any febrile state, any irritation of the bowels, or unhealthy condition of the skin.

Do not vaccinate, except in cases of great necessity, where there has been recent exposure to the infection of measles, scarlet fever, or diphtheria, or where erysipelas has been prevailing in or about the place of residence.

Second—In all ordinary cases of primary vaccination make such insertions of vaccine virus as will produce at least two or more separate good sized vesicles, which should be carefully protected from injury during their progress toward maturation, avoiding afterward the premature removal of the crust. Do not use any needless dressing to a vaccinated arm; a simple strip of clean, soft muslin, carefully sewed round the arm, will protect it from abrasion.

Third—The virus used should be of known purity, whether in the form of humanized or bovine lymph. The crust or scab should never be used except in cases of necessity, and then only under the surveillance of the physician. Self-vaccination, or vaccination performed by unprofessional friends, unqualified to distinguish the true sore from that which is spurious, is often attended by serious results, and might be the means of introducing poisonous matter into the blood, which ought to be avoided, as death may be the consequence.

Fourth—Virus should *never* be used from the arms of revaccinated persons. There is no evidence that it possesses any protective power; but, on the contrary, may be injurious.

Human lymph should be taken only from subjects who are in good health, and of healthy parentage, preferring children whose families are known to you. Take the lymph from well marked, uninjured vesicles, when the vesicles are fully formed and plump. That is on the eighth day after primary vaccination, and before any conspicuous appearance of the red or inflammatory areola, which on the ninth day surrounds the vesicle. In opening the vesicles, which is done with a clean needle, be careful not to draw blood, and use no lymph or virus that is not perfectly clear and transparent when it exudes from the arm. If any blood should be drawn, wipe it carefully away before using the lymph, as on no account must blood be introduced with pure vaccine virus into the system of your patient. A most important point, upon which we strenuously insist, is that the vaccinating instrument, no matter what it is, is perfectly and undoubtedly clean; to be sure, wash it in fresh and pure water before using, and see that it is rewashed before using it on a second person. More serious and unfortunate accidents have occurred from carelessness in using unclean instruments than from any other cause known to this Board. If bovine virus is used, recollect that to insure its action the surface receiving it has to be well abraded and the lymph thoroughly rubbed in until the part is dry; neglect of this rule will result in many failures and bovine virus be unduly discredited.

Never use the scab for vaccinating purposes, except under the most exceptional circumstances; to its use may be attributed those cases of sore arms, poisoned blood, and unhealthy ulcers, which anti-vaccinators take such delight in quoting as their strongest argument against the precious gift of the immortal Jenner.

If the necessity arises that the scab must be used, see that it looks clean, is well umbilicated, and the edges semi-transparent. Do not use the center, but only the outer border of the crust. The portion to be used ought to be thoroughly softened in a drop or two of water, and then used in the same manner as lymph. It would be prudent to ascertain the condition of the child from whom the scab was taken before using it, and if not in perfect health, reject it. Caution cannot be too strictly observed when vaccinating from this source.

In smallpox there is always a period of latency, called the period of incubation, during which certain processes are going on preparatory to the development of the disease. This

period may be stated to be about ten to twelve days for the beginning of the fever, and fourteen days for that of the eruption. In the vaccine disease the virus begins to *take* on the fourth day, and with bovine virus on the fifth or sixth day, and such is the protective power of the vaccine virus that if it be inserted even after exposure to smallpox its shorter incubative stage enables it to anticipate the other, and if it do not altogether prevent it, it induces such a deviation from its regular course as to essentially modify it and deprive it of its greatest danger. Hence the importance of immediate vaccination after exposure to smallpox.

Every infant should be vaccinated within three or four months after its birth.

Every child should be revaccinated before its tenth year.

No child should be permitted to enter any school until it is successfully vaccinated, and so certified to by the operating physician.

Every adult should be revaccinated every seven years. It may not take, but it secures the safety of those who try it.

In the Presence of the Disease.

No time should be lost, but a general vaccination insisted upon. Fortunately it is our great privilege to live in California, the inhabitants of which are too intelligent and well informed not to see the importance of this measure when smallpox invades their town or city. Smallpox in a community means the paralyzing of all trade and commerce. It means pecuniary loss, sickness, suffering, destitution, deformity, or death. It means a condition of things that in a civilized community could and should be at once arrested. All employers must take the initiative, and have every man in their employ vaccinated as the condition upon which their employment is continued. All railroad men, police officers, and those connected with public offices, should especially be protected, as they are constantly exposed through the traveling public to the germs of the disease, which may be lurking in the wayfarers' clothes, or among their baggage. In short, it is the imperative duty of the local authorities to secure protection to all classes, that none remain unprotected, to the imminent danger of their fellow citizens.

Smallpox in the House.

When, unfortunately, this occurrence has taken place, at once notify the Health Officer or the health authorities, then have every member of the family vaccinated at once. Smallpox, as said before, takes ten to fourteen days after exposure before it becomes apparent. Vaccine takes only four to six days. If, therefore, you are immediately vaccinated after exposure you will anticipate the disease, and either avert it or so modify it as to render it comparatively harmless and mild.

The patient should be placed, if practicable, in the highest room in the house, and as distant from the apartments of the rest of the family as possible. Here he should have the most complete isolation and ventilation that can be attained. The room, before occupancy, should be stripped of all unnecessary furniture, carpets, curtains, woollen goods, and clothing, and the utmost cleanliness observed, both with regard to the patient and the room. Disinfectants may be constantly used; especially should a vessel containing chloride of lime be placed at the bedside for patients to spit into. The same should be used freely in the vessels required for the reception of excreta, which should be at once removed and buried. Lastly, a large tub containing a disinfectant solution should be kept in the room, into which all soiled clothes could at once be plunged and removed for further disinfection. Rags should be used to wipe away all secretions from the mouth or nose, and immediately burned. All glasses, cups, or other vessels used by the patient, must be scrupulously cleansed and washed in a disinfectant solution. No person should be admitted into the room but those waiting upon the patient; and a sheet wrung out of a strong disinfectant solution ought to be suspended outside the door of the patient's room.

Smallpox is in its most contagious condition when the scabs are matured, and no convalescent patient should be permitted to mingle with his family until all the scabs have fallen off and the skin quite clean.

In case of death, wrap the body in a sheet saturated with a strong solution of sulphate of zinc, and have it coffined and buried without any unnecessary delay, without any wake or public funeral.

Disinfectant Solutions.

As these solutions are within the means of every one, the State Board of Health thinks it well to familiarize the public with their composition:

Roll Sulphur (brimstone), for fumigation. This is a cheap and efficient substance for fumigating rooms; it is positively destructive to disease germs, when efficiently used.

Sulphate of Iron (copperas), dissolved in the proportion of one and a half pounds to the gallon of water, is a cheap and reliable deodorizer and antiseptic for privies, cesspools, sewers, etc.

Sulphate of Zinc, in the proportion of four ounces of sulphate and two ounces of common salt to the gallon of water, is efficient and harmless for clothing, bed linen, blankets, etc. It should be used boiling hot, and the articles to be disinfected plunged into it and thoroughly boiled.

Corrosive Sublimite, in the proportion of a quarter of an ounce to the gallon, is an unsurpassed germicide and disinfectant, but has the disadvantage of being excessively poisonous, and therefore dangerous for general use.

Carbolic Acid is of uncertain strength, is expensive, and experience has shown that it must be employed in comparatively large quantities to be of any use. It is also liable, by its strong odor, to give a false sense of security.

How to Use Disinfectants.

I. *In the Sick Room.* The most available agents are fresh air and cleanliness. The clothing, towels, bed linen, etc., should, on removal from the patient, be placed in a tub of the zinc solution, boiling hot if possible. All discharges from the patient should either be received in vessels containing the copperas or corrosive sublimate solution, or if this is impracticable, should be covered with the solution. Unnecessary furniture, especially that which is stuffed, carpets, and hangings should be removed from the room at the outset if possible; otherwise they should remain for fumigation and treatment.

II. *Fumigation with sulphur* is the only practical method of disinfecting the house. For this purpose the rooms to be disinfected *must be vacated*. Heavy clothing, blankets, bedding, and other articles which cannot be treated with the zinc solution, should be opened and exposed during fumigation, as directed below: Close the rooms as tightly as possible, stopping up every crevice and keyhole; place the sulphur in iron pans supported upon bricks placed in washtubs containing a little water; set it on fire with alcohol or kerosene sprinkled upon it, and allow the room to remain closed twenty-four hours. For a room ten feet square at least two pounds of sulphur will be required; for larger rooms proportionately larger quantities will be necessary.

III. *Premises*, cellars, yards, stables, gutters, privies, cesspools, water-closets, sewers, drains, should be liberally treated with the copperas solution; it is cheap and effective. The copperas solution may be easily prepared by hanging a basket containing about sixty pounds of copperas in a barrel of water.

IV. *Body and Bedclothing.* It is best to burn all articles which have been in contact with persons sick with infectious or contagious diseases. Articles too valuable to be destroyed should be treated as follows: *Cotton, linen, flannel, blankets, etc.*, should be treated with the boiling hot zinc solution; introduce piece by piece; secure thorough wetting, and boil for half an hour. *Furs, silks, heavy woolen clothing, bedcovers, and beds*, which cannot be thus treated with the zinc solution, should be hung in the room during fumigation, their surfaces fully exposed, and their pockets turned inside out; afterwards they should be hung in the open air—beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., should be cut open, the contents spread out and thoroughly fumigated. Carpets are best fumigated on the floor, but should afterwards be removed to the open air and thoroughly shaken and beaten.

Finally.

If, from neglect or delay in enforcing precautionary measures, the disease shows a tendency to become epidemic, the public and private schools must be closed, church services suspended, and public assemblages of people, as at theaters, shows, circuses, skating rinks, or other gatherings, be prohibited. Other towns or cities would be fully justified in maintaining a non-intercourse quarantine against any place neglecting to enforce the sanitary measures which all past experience has heretofore demonstrated to be effective in "stamping out" this most loathsome and contagious of all contagious disorders.

GERRARD G. TYRRELL,
Permanent Secretary State Board of Health.

By order of the Board.

H. S. ORME, M.D., President.

Copies of this circular can be had for free distribution upon application to the Secretary, Sacramento.

The effect of this circular was at once apparent. Vaccination became quite general, and the supply of bovine for a time scarce, the demand being so great.

In the "Monthly Circular" for February, the State was warned of the advent of smallpox, and the necessity of general vaccination insisted upon; but as this bulletin reaches comparatively few, except when republished by the press, the advice was not heeded to the same extent as that given in the "Smallpox Circular."

In June, 1887, three cases of smallpox were discovered in Irvington, a village in Alameda County. Isolation and quarantine were at once established, and no other cases developed there.

In August a case of varioloid appeared in Berkeley, which was at once conveyed to the Oakland Smallpox Hospital. No other cases were reported.

In September, one case appeared in Oakland, and one in Cloverdale. In October, a case was reported in Oakland. In November, two cases were reported near Suisun, one case in Elmira, and one in Oakland. The disease was making some progress through the State, but very slowly. In December,

it was reported in Alameda, Solano, Marin, Sonoma, San Joaquin, Butte, Contra Costa, Nevada, Siskiyou, Lake, and Sierra Counties. The cases were small in number, but all as far as known traced their origin to San Francisco. In Sierra City the disease at one time assumed almost epidemic proportions. In response to a letter from us asking particulars of the outbreak in Sierra City, Dr. Tully replied that during the latter part of November, 1887, a saloon keeper named Joe —, was taken sick and attended by a physician, who told him that "he had smallpox, but as it was a mild case there was no need of making any fuss about it." Consequently none was made, and visitors were freely admitted to his room and allowed to sit in the barroom before he was fully convalescent, and to mingle freely with the public. The second case was a waitress in the same hotel in which the saloon keeper worked, and had visited his room daily. She was confined to bed after a few days' premonitory illness, but no announcement of smallpox was yet made. The third case was a miner who lived in the hotel and was one of the visitors to the first patient. The fourth case was also a miner and boarder at the hotel. These cases, the first seen by Dr. Tully, were formally declared to be smallpox, and steps were taken to quarantine the patients. Dr. Jump, of Downieville, saw these patients and confirmed Dr. Tully's diagnosis. Thirty cases occurred in the town, twenty-eight of which were directly traceable to the *mild* case in the hotel. Five deaths resulted from the mistake in not taking the necessary precautions with the first case and having it perfectly quarantined, isolated, and disinfected. The disease spread to North Bloomfield, where two cases occurred with one death. It appeared also in Sierra Valley, Loyalton, and Satley. In January, 1888, a rigid quarantine was instituted, and the disease ceased to spread.

We find in the "Monthly Circular" that during the month of January cases were reported in different parts of the State: two hundred and twenty-four in San Francisco, ten in Los Angeles, eight in Stockton, eleven in San José, three in Dunsmuir, two in Red Bluff, two in Redding, two in Sacramento, two in Berkeley, eight in Martinez, three in Tulare, one in Delta, Castroville, Santa Rosa, Cloverdale, Santa Barbara, Yuba City, Riverside, and Chico. Of the two cases in Redding, Dr. Miller writes that one of them was contracted from a dog carrying the infection in his hair to the child, who lived a quarter of a mile from where the other patient was quarantined. It seemed, however, that this dog was constantly by the sick man's side, and went from there to visit the child, to whom he was much attached. The disease was therefore attributed very justly to the visits of this canine, and is a good illustration of the danger that arises from the presence of animals in the sick room. In February the disease began to show symptoms of abating. No new cases appeared in San Diego; in Los Angeles the disease was also lessened in numbers, likewise in San Francisco. In Oakland only seven cases were reported, and in San Francisco the number had fallen to one hundred and fifteen, of these eighteen were Chinamen, fifteen of them importing the disease directly from China.

Reports were received that the disease was spreading in the interior of the State, from want of proper appreciation of the necessity of isolation and quarantine. The following letter was received on the eighth day of March, 1888, from Calaveras County:

WEST POINT, CALIFORNIA, March 8, 1888.

G. G. TYRRELL, M.D., *Secretary State Board of Health* :

DEAR SIR: A rather peculiar type of an eruptive disease has been infecting most all of the towns of this county, which, quite probably, has been reported to you before this; and I write you to know if this is the only locality of the State which has been subject to it. Being now at the time of the smallpox scare, of course these cases cause no little alarm. The cases in Mokelumne Hill and this vicinity seem to have originated from a case in Howe's Hotel, in San Andreas, where (and also at Murphys) they have had many other cases. I have a case here, in the midst of town, above one of the stores, which is a typical case, and which came directly from similar cases at Mokelumne Hill. Young man, about twenty-six or twenty-eight years old; taken down ten days ago; intense fever; temperature, $106\frac{1}{2}$ degrees; headache; vomiting; fever ranged from 103 degrees to 106 degrees for about two days and a half, when a slight eruption appeared on his forehead—little red papules, like beginning of measles. Fever came down to 100 degrees, in two or three days. This eruption covered his entire body, with hardly a place to put a pin's head; it enlarged to the size of No. 3 shot on the face and neck; on the hands, arms, and legs the eruption was as large as buckshot, semi-ovoid. Yesterday and day before (eighth and ninth days) they were pustular, and although I had not seen him for four days, I judged they had been in that condition for two or three days. Last night (ninth day) his temperature was 103 degrees. These pustules itch very little, but he is in great misery from the heat and burning produced.

If not smallpox it is at least a most revolting and loathsome disease. He is swollen all over his body, face particularly, so that he has not seen out of his eyes for three or four days. They tell me that very few pits are left from the cases around San Andreas or Mokelumne Hill. This is my first in this village. I am told that on the falling off of the scabs slightly elevated spots are left, as a rule, although quite often pits are left where the pustules are scratched. There is no noticeable odor. Dr. Murphy, of San Andreas, claims all the cases in San Andreas are chickenpox. Dr. Kelly, of Murphys, and Dr. Thompson, of Mokelumne Hill, claim them to be smallpox. Whatever their cases are mine is, for it originated from theirs, although this case is the most severe of any one so far. If it is chickenpox, why is he now, at the ninth day, not improving, instead of being covered from head to foot with five thousand vesicles, of a dirty yellow color, from the size of a No. 3 shot to buckshot, with temperature at 103 degrees?

If it is chickenpox, why were the premonitory symptoms so severe for three days, with temperature at from 104 degrees to $106\frac{1}{2}$ degrees before the eruption? The eruption is (if any difference) more marked on the face.

If it is chickenpox, is it not strange to have the vesicles of such a large size and in such large number?

If it is smallpox, there has been no fatal case, excepting a Mrs. Benson, of San Andreas, who had a premature labor at the same time.

If it is neither chickenpox nor smallpox, what is it? It certainly is contagious, and a disease that is at least undesirable in a community.

Very truly yours,

AUSTIN C. WRIGHT, M.D.

Upon receipt of this letter we replied that the disease described by him was undoubtedly *smallpox*. To have the place isolated, quarantined, and the premises disinfected; also to institute a general vaccination at once, or the result of negligence might be serious; and also to report regularly to this Board the progress of the disease. No word was received until the fourth of April. In the meantime I had written to him to know the reason why no communication was sent this office. The following is the doctor's reply:

MOKELUMNE HILL, CALIFORNIA, }
April 4, 1888.

G. G. TYRRELL, M.D., *Sacramento, California* :

DEAR DOCTOR: Your letter of the second is at hand. I have not reported to you any of the cases which developed from the case I reported to you the fore part of last month, not from any dislike in giving the locality away, but from the fact that the cases that afterwards developed were of such a very mild form that I could not conscientiously report them as *smallpox*. There were four resulting from the primary case, three in the family in which he staid while sick, and one in that of a neighbor's. One was confined to bed two days, the rest were only indisposed a day or two, and were around town after three or four days after being taken down, and were never confined indoors, I am told, and with no more vesicles on the face and body than in an average case of chickenpox. One that had it *most mild* was a boy that had never been vaccinated. These were in West Point. The only cases in Mokelumne Hill were those in the Ashbury family, where there were eight, I believe, sick—at least these are all I have heard of. There have been no deaths at either places. I should be pleased to get some of the circulars on smallpox published by the State Board of Health, if you have any to spare.

I am yours fraternally,

AUSTIN C. WRIGHT.

As this disease seemed to be a subject of doubt, and was giving rise to a great deal of controversy among the physicians, and alarm among the citizens, at the request of our correspondent, Dr. J. E. Seymour Baker, the officials of Calaveras County summoned me by telegraph to settle the dispute. Accordingly, on March twelfth, we visited San Andreas, Angel's Camp, Duncan's Flat, and Murphys. We found that the cases in these neighborhoods were pronounced by Dr. Baker, of Angel's Camp, unequivocally smallpox, and as positively diagnosed as chickenpox by Dr. Murphy, of San Andreas.

This radical difference of opinion caused a great deal of ill-feeling among the inhabitants, which, unhappily, extended to the physicians in the county. Attended by Dr. Baker we first visited two children who were said to be coming down with chickenpox by the physician in attendance. We found them covered by the well marked rash of scarlet fever, with accompanying sore throat and other prominent symptoms. Across the ravine from this family lived a family among whom had boarded a man who had been six weeks confined to the house with what was pronounced chickenpox; he was then up and out. In this same house the landlady was confined, and died a week after. She left a baby that at the time of our visit was eight days old. Seeking the woman who attended this lady in her confinement, she told us that she had washed the dead body, and it was covered with a black rash, like measles, decomposition setting in very rapidly. Upon asking to see the eight-day old baby, we discovered it covered with papules, hard and shotty, just beginning to vesicate. This baby was seen by Dr. Baker two days after our visit, and vesication was general; in four more days the child died. Upon reaching Murphy's Camp we visited the hotel and there were shown a man in the desquamative stage of discrete smallpox, the crusts being, however, very thickly scattered over his face, arms, and body. In the same hotel we also saw the brother of this man, and also his son, who both had had the disease in a very mild form, the stains on face and hands being few. Across the street we examined a lady convalescent from the disease. She exhibited extensive stains on arms, face, body, and legs. She had been very ill for seven weeks, with what was designated by her physician as chickenpox. A little farther down were shown two children who were well covered with desiccating scabs, which had not yet dried upon their arms. These cases were also called chickenpox. We were now introduced to a bald-headed man, whose name has escaped my memory, who had several stains upon his head and face, who contracted the disease from two children in the hotel at San Andreas, whom Dr. Murphy declared had nothing but chickenpox. We now were shown several persons, young and old, who had the disease, and were now convalescent, and all presented the characteristic stains of the disease, some pitted, and others without any depressed scars.

Unhesitatingly we pronounced them all smallpox, and ordered immediate isolation and quarantine of those sick, and a general vaccination of those remaining well. Our declaration of the disease in this town was treated with most decidedly expressed unbelief; there were, however, a goodly few who thought that we were more likely to be right than wrong, and took steps accordingly.

Upon visiting and inspecting Angel's Camp we became satisfied that there was no smallpox in that town, neither had there been up to the time of our visit. We learned, however, that several cases were at Old Gulch and Sheep Ranch, but had not time to visit the ground and confirm the rumor.

We now visited San Andreas, where the disease first started. We learned that in the hotel a man from San Francisco stopped there over

night who was ill; next day he continued his journey. Some few days after his departure three or four children developed an eruption in a discrete form; these cases were unhesitatingly declared chickenpox by Dr. Murphy, of San Andreas, who attended them. The disease was evidently very mild, as the children were scarcely sick with it. However, the laundry woman who washed their clothes took confluent smallpox, according to the testimony of Dr. Kelly, an old and respected practitioner of Angel's Camp, and after a few days illness died. The local physician testified that she died from miscarriage. From this case several others arose, but all were in a very mild form.

On arrival in San Andreas I was assured by Dr. Murphy that there was not a case of sickness in town; but hearing there was a young lady ill with the "chickenpox" just out on her, we saw Dr. Murphy and asked his company to the house, that we might see for ourselves a case of this remarkable outbreak. Upon entering the dwelling, and the room where the young lady lay, we were hardly surprised to see the poor girl literally one mass of pustular eruption, each pustule as large as a pea fully distended, and so closely packed that some had become confluent. We asked the "doctor" if he really called this a case of chickenpox. He replied that "certainly it was; it was just the same as all the others he attended, but the pustules were thicker in number and larger in size." When I declared it a case of confluent smallpox, he said: "Then all the books are wrong, if that is smallpox." Upon further inquiry we found that both father and mother of the girl had had the disease in a very light form. The stains still remained on their faces, but they were convinced they had chickenpox only. We learned subsequently that the girl recovered, deeply pock-marked, and that her brothers, who were permitted to visit her after our declaration of the disease, both took the disease, and one died after a few days' illness of hemorrhage of the bowels; the second brother recovered.

During my stay several cases were presented to my notice, all giving undoubted histories and evidence of having had the disease which we now officially declared to be, unqualifiedly, smallpox, and requested the Supervisors to call a meeting, divide the county into districts, order all cases now existing into quarantine, appoint Health Officers over every district, provide for vaccination for everybody, and that by vigilance and care they might prevent the spread of the disease. Your Secretary regrets to say that although his advice was taken by the Supervisors, my declaration of the disease was not believed. Even the press denied the truth of our statement, and as a result in a short time they had the disease in the county jail.

In Murphys they did accept the advice of the Board of Health, and the disease soon disappeared; but throughout Calaveras County the germs are still there, only waiting for a favorable opportunity to break out with renewed violence.

Soon after our return from San Andreas we were summoned by telegraph to Watsonville, Santa Cruz County, to settle a controversy that had arisen between the *regular* and *irregular* practitioners upon the nature of a disease which had there broken out; the *irregulars* claiming that it was pustular eczema, while the Health Officer, Dr. Chalmers, with Dr. Ireland and Dr. Spence, regular physicians, asserted the disease to be smallpox. Upon my arrival, in company with these doctors we visited a Miss L—— (an eczema case) and found her in the desquamative stage of variola, the crusts being remarkably thick and numerous on her face, arms, and limbs. From this house we proceeded to visit a Miss A——, whom we found convalescing from quite a severe attack of discrete smallpox, the crusts being all detached, the stains remaining. Dr. Chalmers, the Health

Officer, had had both these places quarantined, despite the earnest protestations of the occupants. We next visited Mrs. F—— and daughter, about four miles and a half from the town. We found the mother recovered from an attack of discrete smallpox, and the daughter suffering from a severe attack of confluent variola, just maturing. We next visited a Miss P——, living at the edge of the town. She was just coming down with what promised to be a confluent case. At the time of our visit the disease was in the papular stage. All these cases were so indisputably smallpox that we had no hesitation whatever in officially so declaring them; advised strict quarantine, isolation, disinfection, and fumigation, with division of town into districts, house to house visitation, and general vaccination without charge. We afterwards met the skeptical "medicos" and explained the differential diagnosis between eczema and smallpox, and recommended to them a closer study of the disease hereafter.

In Eureka, Humboldt County, five cases of smallpox were reported during March. In San Francisco the number had diminished to twenty-three; four were reported in Oakland; in Stockton two new cases appeared, three in Redding, and two in Millville; cases also occurred in Oceanside, Los Angeles County, Downey, Monrovia, Ontario, Point Reyes, Gilroy, San José, Santa Cruz, Watsonville, Sisson, West Point, Duncans Flat, Murphys, San Andreas, Sheep Ranch, Alvarado, Merced, and perhaps some other points not reported, as we found that the desire for concealment outweighed by far the sense of injury it did to the public. Both individuals and officials were very reticent in announcing the arrival of smallpox in their vicinity, and as a consequence the spread of the disease was practically unlimited; fortunately the type of the disease was particularly mild; in fact, some of those attacked were not even confined to bed, which made the afflicted doubt that they had the disease, and the supposition was more in the direction of varicella than variola. By the first of July the disease had almost entirely ceased, there being but one case reported throughout the State, and that in San Francisco.

Although smallpox ceased to be reported, and to all appearances had died out, we are convinced that the disease only slumbereth, and that as the winter season approaches it will awaken with renewed life and activity, especially in those places where sanitary precautions were wholly neglected, and sanitary measures not taken to destroy the germs where they existed during the past spring. That specific exterior agency which we call infection is there present, and only awaits some peculiar meteorological changes, and those alterations in the human system whereby the blood becomes possessor of some material quality which renders it susceptible to the action of the poison, to develop into the characteristic disease. Whether the smallpox thus developed will remain of the same benign character which was so prominent a feature of the epidemic that prevailed this past winter is a problem that time alone can solve. If it should prove to be of a malignant nature, then indeed will California have cause to lament the apathy and indifference which permitted her local authorities to be so lax in their duties to the public.

DIPHTHERIA.

The reports during the past two years give conclusive proof that diphtheria is a permanent visitor in the State. Every month some town or other reports its presence, and until some coöperative effort is made to suppress it by those sanitary measures which have heretofore, in other places, proved successful, we may expect to see it propagated and kept alive, to the injury of the State and the sacrifice of many young lives that ought to have been

saved. We believe that the consensus of medical opinion is that diphtheria is never of spontaneous origin, but has its development dependent upon an infection from a previous case, and that whenever it appears among a community it is the result of exposure to the disease, either mediately or immediately. We find it in this State following the lines of travel. When it is severe in San Francisco it gradually radiates over the State, first attacking the centers of population, and then being carried into the remoter towns and villages. It prevailed during the fall of 1886 in several large towns in the State, sporadic cases constantly being reported in the smaller hamlets and villages. The general type of the malady was mild. In December of that year there seemed to be a recrudescence of the disease. In Maxwell, Colusa County, there was quite an epidemic of sore throat. In Sacramento, as diphtheritic croup, it was very fatal, and in San Francisco it seemed to have regained fresh vigor. During the spring months of 1887 it continued to be reported in various parts of the State. In Napa Dr. M. B. Pond writes that the cases were of unusual severity. As the winter approached the number of cases increased.

In October we received a communication from the Board of Trustees of Wheatland asking us to visit the town and decide upon a disease of the throat that was quite prevalent and alarming the citizens; a difference of opinion existing among the physicians as to its nature determined this course. Accordingly we arrived there on the afternoon of the seventeenth instant, and learned that a boy six years old had died, after a few days' illness, from what his attending physician called tonsilitis, and that several children were sick with the same disease. The public school was closed, and opinion was much divided upon the question of infection or non-infection. In company with the Trustees we visited the house of Mrs. S—, and learned from her that her boy, aged six years, was attending school; he came home with high fever, headache, and pain in his throat: his mother said that both his tonsils were covered with a white exudation, what she called a "thick coat of matter;" had no difficulty in swallowing, and no impairment of his voice; he was out of bed every day; slept with his brother, and latterly with his mother, and took, she said, plenty of nourishment; on the tenth day of his illness he became suddenly cold and covered with a damp sweat, lay over on the bed and died. The attending physician certified that he died from blood poisoning, the result of breaking of two tonsillar abscesses. This child's brother, who slept with him, a few days after had a chill, high fever, and sore throat. Upon examination exudation was seen on both tonsils, was very weak, but at no time had any difficulty of breathing or swallowing; he was now convalescing. The mother, who also slept with the child, had a sore throat, with, she said, a white deposit upon both tonsils. All these cases were pronounced tonsilitis by Dr. W—, the attending physician. Next door we visited a Mrs. H—, whose daughter, aged eleven years, was ill for seven days. Upon examination a well marked diphtheritic exudation was seen on both tonsils. The day previous, she said, a large piece of membrane had come away. She had no difficulty in swallowing or breathing, but had had high fever for four days; the fever is now subsiding and she is convalescing. Her physician, Dr. Melton, called her disease diphtheria. A brother of this young lady, living in the same house, had also a sore throat with exudation upon both tonsils; remains of exudation still visible, but the boy is convalescing. The mother of these children stated that she was taken with sore throat, without much fever, and recovered in a few days. We next visited the house of Mr. S—; found one girl with white patch on her tonsils; she had had fever, but was now able to be about. These three

houses were together in a row, and communication between them unrestricted. We next crossed over a couple of blocks to the residence of Mr. B—; examined his daughter who had been ill with fever and sore throat; it was still quite red, but the diphtheritic patches had disappeared. She had, however, some faucial paralysis remaining.

The disease began in the house of Mr. S—. Here we found the pump standing upon one edge of the kitchen sink. The pump well was a bored one, one hundred and nine feet deep, and cased with iron, as indeed were all the pumps we examined. The sink being under the pump, its drainage fell therein, and the dishwater, etc., was carried through this sink to a vitrified-pipe sewer, without any trap, and the joints of which were loose. This sewer pipe was connected with the sewer pipe from the next door. It was likewise untrapped, and nothing that could be seen prevented the entrance of the sewer air into the house. From this source it is possible the infection was conveyed. We next visited the school house, which was closed. The water used by the children is supplied by a *cased* pump, and over one hundred feet deep. The privies are at least three hundred feet away, and situated upon a slope inclining from the pump. We learned that all the stricken children attended this school, and Mr. S—'s child was there on the day he complained of being ill, and the subsequent day, when he went home to bed with a sore throat. The children, as a rule, bring their own drinking cups with them, but on the day of our visit three or four drinking cups lay in the trough under the pump spout, and we were assured that the children drank out of any cup that might be handy, without discrimination.

The history of these cases is that on Wednesday and Thursday the S— boy was in school, with high fever and sore throat. His mother thought it nothing but a cold, and accordingly sent him next day to school. He afterwards was confined to the house, in bed. The H— child was taken sick in the adjoining house the same day, and the S— children in the adjoining house the day after. The following Monday the girl of Mr. B—, two blocks away, was taken with the fever and sore throat, which is strong evidence that all these cases were derived from Mr. S—'s child, the one first attacked. The Trustees very properly closed the school, until it could be officially ascertained what disease they had to contend with. Upon eliciting these facts, and carefully weighing all the evidence given by the parties interested, we had no hesitancy in writing a report for the Trustees, giving it as our opinion that the disease was diphtheria, the first case being virulent, the child dying on the tenth day of septicæmia. It was also our opinion that all the other cases observed were diphtheria in a milder form, and that there was no tonsillitis, except that inseparable and usual with faucial diphtheria. We advised that the school house be immediately and thoroughly disinfected and fumigated, under the superintendence of a competent person, and that no child be admitted until this was perfectly accomplished. That all the houses and clothing where the disease had existed be also disinfected and fumigated, and that none of the convalescent children be permitted among the other children for at least two weeks longer, and not then except the Trustees were perfectly satisfied that disinfection had been fully accomplished. We also strongly recommended the appointment of a competent Health Officer, with power to have the town thoroughly cleansed and disinfected; the privies abolished, and earth closets substituted; the cess-pools emptied and cemented, to prevent soil pollution, and that they be again emptied every few months. The directions being in a great part acted upon, the disease disappeared in a short time.

We have related the incidents of this visit to show how easily a disease may attain even epidemic proportions from neglect of the first case, or ignorance in determining its nature.

In a place called Pine Creek, some eight miles east of Cana, and sixteen miles from Chico, an outbreak of diphtheria occurred about December. Dr. Harvey, of Vina, had twenty-eight cases, with two deaths. The first two cases came from the foothills. Dr. O. Stansbury, writing from Chico, says: "We would wonder, if we knew the locality where these cases were reported to have been, that the disease should exist there, as it is very near the foothills, sparsely settled, and where we would naturally suppose the drainage to be good."

We were unable to ascertain the history of the two cases from the foothills, from which the disease spread; but the lesson teaches us that neither sparseness of population, good drainage, nor elevation will prevent the spread of diphtheria, if general prophylaxis is neglected.

Dr. J. H. Miller, of Redding, reports in November, 1887, an epidemic of laryngitis, with kindred throat and bronchial inflammations, with six deaths attributed by him to the hot days and warm nights and the constant cloud of dust in the principal streets of that city. "One autopsy was made and the disease," he says, "definitely ascertained to be *true croup*." The doctor says it was not diphtheria; that the prevailing disease was laryngitis, with or without exudation. In the present state of medical opinion, we fear the verdict would be diphtheria.

In December a limited epidemic of diphtheria occurred in and some few miles from Suisun, which were under the care of Dr. Downing; some of them proved rapidly fatal. Their origin was not traced; the disease continued for a couple of months, when it gradually subsided.

In April of this year, in Rocklin, quite an epidemic of the disease prevailed. Dr. H. E. Stafford reports forty-four cases, with many other cases of sore throat, which, although quite mild, were probably diphtheritic. The origin of the disease was traced to a family whose sanitary condition was of the worst possible description. From this family, it was communicated to neighbors' children, who were playing close by. Another factor, in the spread of the disease, was an open sewer or ditch, that was used as a receptacle for a large portion of the filth of the town, and from which was constantly exhaled a most offensive odor. Owing to the comparatively dry winter, this drain was not washed out as usual by the winter's rain, and hence its putridity. If an example was needed of the close relation that filth bears to disease, it may be found in the history of this epidemic in Rocklin. Founded in filth, fostered in an insanitary home, the germs cultivated and diffused by the decomposition of animal and vegetable matter in an open ditch, polluting both air and soil, the result could be no other than it was, with its attendant deaths, that might have been prevented.

In a letter received from Dr. A. J. Comstock, of Ventura, he describes an outbreak of measles complicated with diphtheria. As the doctor's description is very interesting, we will take the liberty of transcribing it. He says: "The first case was that of a child brought by its mother from Monrovia, Los Angeles County, and the mother thinks it was exposed on the train, there being a sick child in the seat next them, which was feverish and had an eruption on the skin. Her child was taken ill two weeks after reaching here. The first symptoms were sore throat, enlarged cervical glands, high fever, prostration, but with this, coryza congested conjunctiva, and other prodromes of measles. Put child on treatment for diphtheria; second day eruption of measles appeared. The child was taken down in a small country house where there was a family of five

children who had never had the measles. Two other families (relatives) were exposed the day the child was taken sick. Nine children of the several families exposed were taken in due time with the measles, and all complicated with diphtheria, most of the cases being the nasal form. One died of membranous croup in this county; one was taken to Monrovia and died of membranous croup. These two were brothers; one two and a half years, the other four years old. All the older members of the family had diphtheria more or less severely. Several are under my charge, still being very dropsical, and passing large amounts of albumen in their urine. Some of the children had albuminous urine with dropsical following, as well as different paralyses among them all. Have managed to confine the disease to the three families mentioned. I consider it remarkable to see the two poisons (measles and diphtheria) break out in the manner stated. It would not seem so strange were it scarlatina and diphtheria."

From the history of these cases we are led to believe that it is possible for two different poisons to be present in the system at the same time, and manifest their presence by their peculiar symptoms; what the unknown factor is that inhibits dual disease in the majority, and permits it in the few, would be an interesting problem to solve. The power of producing this disease has been ascribed to as many different causes as there have been conditions under which it has been observed. It has been generally described as a *filth disease*, that is to say, that it owes its existence to sewer gas, cesspools, impure water, decaying vegetation, overcrowding, etc.; but such is not, we believe, the fact, as cases have occurred and death has entered into homes where no such conditions existed. It is found on the tops of mountains and in secluded valleys, where no possible condition likely to give rise to the disease existed. We are therefore led to infer that it is not dependent upon conditions for its existence, but is a disease produced by a pathogenic micro-organism, and therefore does not originate spontaneously, as we believe no combination of unhygienic conditions can originate life where none existed before. Although the presence of the living germ is necessary to produce the disease, there must be also an unknown factor in the individual, in order that it may germinate and grow. What that factor is, we know not, but we do know that unhygienic conditions, emanations from decaying organic matter and other filth, produce in the human body a deterioration that renders it susceptible to disease whenever it comes in contact with disease germs.

As sanitarians we are concerned as to the means of preventing infection, diphtheria not being an emanation from the unknown, but a something which is carried from place to place. Isolation is, therefore, one of the most reliable means whereby the disease is limited. Unfortunately this preventive means cannot be complete until the public mind is impressed with a belief in the contagiousness of the disease, and that, unlike small-pox, one attack does not secure immunity from a subsequent one. Precautions will then be taken to limit the visitation of the sick by the well; to prevent children attending school when diphtheria is in their dwelling; to remove all carriers of contagion, and all conditions likely to foster the disease or propagate its germs. We would recommend, as a means to this end, that the Legislature pass a law making it compulsory on physicians and householders to notify the local authorities, whenever a case of diphtheria occurs within their knowledge, and then designate the place of its location by a distinctive card or flag, to warn the public that contagious disease is within. It should also be made compulsory to have every house, in which diphtheria has been, disinfected and fumigated, together with the

persons occupying the same. By these means we may hope, in accordance with the completeness with which the means are used, to restrict the spread of a disease which is more fatal than smallpox, and, perhaps, less under the control of therapeutic treatment than any disease now known.

SCARLET FEVER,

During the past two years, although present in the State to a greater or less extent, has shown no tendency to epidemicity or any extreme malignancy. In the fall of 1886 it was noticed in a great many towns, but the type was so mild that scarcely any fatality attended it. The infectiveness of this disease is exemplified by a case that occurred in Fort Bidwell. Dr. Kober writes that the disease was conveyed from Warren Valley, in Oregon, sixty miles away, by an uncle of the child, who, having been exposed to the disease, came into the fort and slept upon a bedspread upon the floor, in the residence of the child. Next day the child played upon this spread, and ten days after developed the fever and died. Under the complete sanitation employed by Dr. Kober, the disease was confined to this one case. At a later date Dr. Kober writes: "I was in hope that by proper sanitation, scarlet fever would be limited to an isolated case or two; but, unfortunately, the family, unknown to me, had aired the bedding before I got it disinfected, and, as a result, twenty-six persons were attacked, with six deaths." He further says: "Two of the fatal cases were terrible from the very start, although contracted from mild cases."

In another instance, related by Dr. Edward Gray, of Benicia, he says: "The disease (scarlet fever) suddenly made its appearance in town June second. Next day it appeared in two other families, and finally in two more. In my opinion, it originated from the contact of some of our townspeople and children with the participants in the Caledonian picnic held May twenty-fifth, at Shell Mound Park, Oakland. Twelve cases were developed, of which two died. As these cases occurred simultaneously, eight and ten days after exposure, and all occurring in those attending the picnic, the conclusion is almost irresistible that such was its origin."

Dr. Adams, of Lone, also relates the instance of an outbreak of scarlet fever in his town. Its origin was traced to a family who had scarlet fever some months previously, but who attended a picnic without taking any precaution to have their clothes disinfected before doing so. The disease attacked sixteen children simultaneously, and some forty-eight persons were attacked with sore throat forty-eight hours after the picnic, at which ice cream was freely dispensed. It is possible that some connection existed between the fever, the sore throat, and the ice cream, but Dr. Adams was unable to trace it.

Some few cases of scarlet fever were reported in Hopland by Dr. H. G. Pike, but the type was exceedingly mild, and called for no comment. Indeed, the remarkable features about the scarlet fever of the past two years was its sporadic character; usually so communicable its limited extension was so marked as to excite surprise. Why the disease should be so virulent and fatal at one time, and so mild at a subsequent manifestation, is one of the problems of medicine that await further research.

In London, where, in 1887, the disease was epidemic, as many as twelve hundred cases being in hospital at one time, its spread was attributed to the unusually warm weather prevailing at the period.

In this State, during the same period, the weather was very much warmer, yet it did not increase the prevalence of the disease, nor cause its extension beyond its original place of development. Some cases, however,

have occurred and attended, we regret to say, by fatal results, from the carelessness of those upon whose premises the disease existed. In one particular case a gentleman was visiting a family in which scarlet fever prevailed; he was not made aware of the fact, and unconsciously conveyed the germs of the disease to a distant part of the city; there he infected a friend's child who died after a few days' illness. The examples of contagion conveyed almost incredible distances, warns us that some means ought to be provided by law whereby the dissemination of disease could be lessened, if not wholly prevented. It should be made a penal offense to have any infectious disease within a house without a notification to the public, either by a card outside the house or a colored flag hanging in some conspicuous place, to warn the visitor or the traveler that infection was within. This warning would have saved the valuable life above alluded to, and if adopted would lessen the spread of disease most materially. It is done in smallpox, not half as dangerous a disease as diphtheria or scarlet fever, and why not have the same rule applied to scarlet fever and kindred contagious diseases?

MEASLES

Were entirely absent from the State during July and August, 1886. In September a mild type of the disease appeared in Napa County. It was next heard of in Monterey County, Mendocino County, and Shasta. The disease gradually spread until measles prevailed everywhere, but it was not until December of 1887 that it became really epidemic. It prevailed extensively in Sacramento, Oakland, San Francisco, and all the larger cities. In February of 1888 it became quite severe, and in many cases the eruption was mistaken for that of smallpox, being so very dark and markedly papular. The fact has been noted that smallpox is often preceded or immediately followed by measles. This was the case in the great epidemic of 1670, when, according to the observations of Dr. Thos. Sydenham, the measles of that date introduced a kind of smallpox, which he chose to entitle "anomalous smallpox," as he found it different in some particulars from the epidemic form that preceded it. This distinguished physician was the first to describe the difference that existed between smallpox, scarlet fever, and measles, and laid down rules to distinguish one from the other. Up to this time measles and smallpox were often described together, as if one was a modified form of the other. During the prevalence of smallpox it was remarkable the number of cases of measles that were mistaken for smallpox, and in some instances quarantined for that disease. The chief characteristic of measles during the past two years was the generally mild nature of the attacks, and the rarity of the malignant type during the period.

TYPHOID FEVER,

During the years 1887-8, was remarkable for the general sporadic nature of the disease wherever it appeared. There seemed to be no tendency toward epidemicity, and the examples were generally traced to some local cause. It is becoming more and more evident that without a specific cause, typhoid fever would become extinct. During the fall and winter of 1887, typhoid fever was reported as prevailing extensively in Sierra City, but inquiry made of Dr. Jas. Tully contradicted the truth of the assertion. He writes that the disease reported as typhoid was really a remittent fever that ran a course of from ten to twenty-one days. He further says that he saw but one case of genuine typhoid fever during the summer. He con-

siders the frequency of the remittent fever to lack of sewerage and the pollution of the small streams and marshes by refuse matter.

In San Diego, during the fall 1887, typhoid fever was reported as prevailing to a great extent. Dr. T. L. Magee, Secretary of the San Diego Board of Health, in reply to a letter of inquiry from Dr. Orme, President of this Board, admits that there were quite a number of cases of fever from time to time, but characterizes them as non-specific continued fever, although he confesses that some practitioners called them typhoid, and others typho-malarial fever. In a letter received from Dr. Huntingdon, United States Army, in medical charge of the garrison at San Diego, and a practitioner of thirty years' standing, he states that in the barracks during the past few months he has treated four cases of undoubted enteric fever. One in a girl thirteen years old and three among the soldiers. He believes that the girl contracted the disease by frequent visits to a part of the town suspected of being infected, and in the soldiers the infection undoubtedly occurred outside of the garrison and by frequenting places of insanitary reputation. He also reported seven cases in private practice, and is of the opinion that typhoid fever is quite prevalent in San Diego: " * * * Like all new and rapidly growing places, San Diego is and will be prone to the reception of all kinds of disease, incident to the presence of filth and the want of sanitary care, but it is to be hoped that the completion of our new sewerage system will make a change for the better." Since that letter was written the new sewerage system has been completed and the health of the city materially improved, neither typho-malarial, typhoid, nor remittent fever have been reported, except in the sporadic form, and from the admirable system of sewerage, and the very efficient Board of Health and its excellent and energetic Health Officer, Dr. Gochbauer, we expect San Diego will become one of the healthiest cities in the State and the least subject to any of those diseases which are bred in filth and matured in insanitary conditions and surroundings.

We do not think that in this day there can be any question as to the intimate relation between filth and disease, and although it may not be always possible to trace cause and effect, yet it is an undoubted fact that the decomposition of organic debris, animal or vegetable, causes pollution of both air and soil, and is a constant source of deterioration of health, even where actual disease is not the result.

Although it is now a generally observed fact that typhoid fever is closely related to dry seasons and coincident with low water in wells, yet these two past seasons in California did not develop any unusual prevalence of typhoid disease, although the weather was dry until late in the year. As a knowledge of the disease and the necessity that exists for disinfection of the discharges from the bowels becomes a matter of common education among the people, we will find that typhoid fever will be confined to the few, and to those who persistently pollute the soil about their houses with slops, garbage, privy vaults, and cesspools improperly constructed, who will not be persuaded that a well fifty feet from a privy can be contaminated by percolation through the soil, or who declare that excreted discharges are perfectly harmless when deposited in the privy vault. It is only through such people that the germ is propagated to the injury of those who unfortunately or inadvertently are brought in contact with them.

Investigation shows that polluted water is the most prolific source of disease in the human family, especially of typhoid fever, and numberless epidemics of this disease have been directly traced to a well polluted by surface drainage and infected with typhoid fever germs. One of the most important facts yet discovered in the pathology of typhoid fever is the detec-

tion by Birch-Hirschfield of germ spores in his stained cultures of bacilli. Gafky found that in potato cultures, kept at the temperature of the body, spores were formed. They were also observed by Sternberg, Flugge, and others; but this is denied by Buchner, Michael Simmonds, and some other experimenters.

Another important discovery was made by Prudden, and that was that typhoid germs were capable of growth and propagation after one hundred and three days' freezing in ice; hence, the importance of seeing that our ice is supplied from sources that are absolutely free from the possibility of sewage contamination. It has also been determined that germs exposed to a heat of 56° C. are not destroyed, and the same investigation showed that alternate thawing and freezing did not destroy the germ. It was also demonstrated that these germs will grow in various media. Milk is one of their favorite culture grounds, and some of the most formidable epidemics have been inaugurated by milk which had been contaminated by the bacillus of typhoid. We must, therefore, in seeking the causes of typhoid fever, look beyond the sewage, and examine carefully the water and milk supply, as these carriers of disease may be polluted from sources that were not even suspected.

As an extended knowledge of what is known as "Heisch's test" would enable every one familiar with it to test in a general way the potability of water, we here insert it: Take six or eight ounces of the water in a *perfectly clean* bottle, and add to it fifteen or twenty grains of the purest white sugar. The bottle must be filled with the mixture and the cork tightly adjusted, so as to exclude the air completely. It is now placed in a warm situation for forty-eight or seventy-two hours. If after twenty-four hours have elapsed the transparency of the water be noticed to have been disturbed, or if it has become cloudy or milky, or if any bad smell or fermentation has developed, the water should unhesitatingly be rejected as unfit for drinking. It is contended by Heisch that the cloudy appearance in the water at the end of twenty-four hours is positive evidence of sewage, or putrescible contamination. This test, so simple that any one can employ it, ought to be applied to every water used for drinking purposes, as, if not perfect as a test, it at all events gives warning that enables us to have such suspected water analyzed by a competent chemist.

MORTUARY STATISTICS.

For the fiscal year from June 30, 1886, to June 30, 1887, the number of deaths reported to this Board were ten thousand three hundred and sixteen, inclusive of three hundred and fifty-seven still-births, the average population being five hundred and seventy-six thousand six hundred and thirty-eight. This gives us an annual death rate of 17 per cent. Owing to our deficient, we might say useless, registration law, it is impossible to collect all the deaths in the State.

The estimated population of the State being one million and a quarter, or perhaps a little less, we calculate that we have succeeded in collecting more than half the deaths that have occurred within the fiscal year. As those towns and villages that have failed to make any returns are small, and whose mortality is very limited, we are justified in believing that six thousand deaths would amply cover their death rate in the year. With this calculation we estimate our yearly death rate for the entire State to be 13.50 per thousand, which will indicate the extreme healthfulness of California during 1886-7, as far as our imperfect statistics can do it.

If we could only impress our legislators with the necessity that exists for

a registration law that would make the returns for mortality a certainty, we would be able to present to the public a report that, being accurate and without exaggeration, would astonish the people of the Eastern States at the salubrity of our climate, and the consequent smallness of our mortality from any epidemic disease. Among the ten thousand three hundred and sixteen deaths recorded we find—

Consumption was fatal to sixteen hundred and seventeen—a percentage of fifteen of all deaths registered. If we compare this percentage with that occurring in the Eastern States from the same disease, we will find that although from the number of persons affected by this disease that annually come to us, we would expect a large death rate, our percentage is much smaller than in most of the Eastern States.

That the favorable conditions of our climate in enabling consumptives to pass the greater part of the year out of doors, is a prominent factor in prolonging the lives of those suffering from tuberculosis, there can be but little doubt, as very many of those coming from the East are in the very last stages of the disease, and yet, under the invigorating air of California, they gain strength and flesh, and perhaps live as many years as they would months in the climate from which they came. Among the sixteen hundred and seventeen deaths registered we find four hundred and ninety-seven natives of the Atlantic States; six hundred and four foreigners; three hundred and nine natives of the Pacific States; one hundred and forty-two of these being under ten years of age, and two hundred and seven whose place of nativity was unascertained. We are justified, therefore, in asserting that the large majority of those dying of consumption in California come to the State already infected with tubercle, and that these infected people are a possible source of infection to others, and tend to develop the disease in those of a scrofulous diathesis, who may be obliged to remain in contact with them, socially or otherwise.

Pneumonia, or acute inflammation of the lungs, caused six hundred and eleven deaths, less than one third of the deaths attributed to consumption; a percentage of 5.92 of all deaths recorded. *Pneumonia* has not been epidemic within the State during the year, or, indeed, very prevalent in any particular place. The seacoast and the higher altitudes furnished the greater number of cases, the temperature being lower and the humidity greater than in the interior counties.

Bronchitis was productive of one hundred and eighty-six deaths, ninety-nine of which were children under ten years of age. The months showing the highest death rates from this disease were the winter months of December, January, and February, and the largest mortality in those over sixty years of age. *Bronchitis*, like *pneumonia*, is much more prevalent in the mountains and along the seacoast than it is in the valleys, the snow line of the former and the humid fogs of the latter bearing a close relation to the frequency of the disease.

Diphtheria, which seems now to be endemic in the State from causes that should not exist, produced death in three hundred and seventy-six instances recorded. If we add to this number at least three hundred more that were not reported, we will approximate very nearly the number of deaths from this disease in the State. If, for a moment, we reflect that all these deaths from diphtheria might possibly have been prevented by proper sanitary precautions against the spread of the disease, and preventive measures against its introduction, we are forcibly impressed with the necessity that exists for properly organized Boards of Health, officered by men who are conscious of the great responsibility that devolves upon them to save the lives of helpless children from this fell destroyer. Among the deaths

here recorded, we find no less than three hundred and three were under ten years of age, forty-four under twenty, and ten under thirty years old. All young, from the infant in the cradle to the man in vigorous life, alike were consigned to an untimely grave.

The largest number of deaths occurred in San Francisco, where the disease prevailed to a greater or less extent during the entire year. Its highest death rate was in November, December, and January, when the deaths averaged nearly thirty-eight a month. The lowest death rate was in July, August, and September, when the average deaths from diphtheria were a little over seven a month. By this we learn that ochlesia, which naturally occurs among the poor in large cities during the winter months, is probably a constant factor in the spread of this disease. Practically we find it impossible to isolate diphtheritic patients among the poor; crowded, as they are, in one or two, or, at most, three rooms, with half a dozen children, intercourse cannot be forbidden with success, and until we are able, through public sentiment, to build hospitals for this class of patients, diphtheria must occur and spread, to as great a danger of the wealthy patron as to the poorest tenant.

In the interior towns and cities the disease was mostly sporadic, in no place did it rise to the dignity of an epidemic. The general public is now so well instructed in the contagiousness of the disease that physicians find little trouble in enforcing sanitary regulations in the destruction of all articles used by the patient, and in general fumigation of the premises, where such is possible; of course, in crowded tenements, it cannot be done with satisfaction, but the attempt is better than none. It should be a law of the land that every house or tenement having within it a case of contagious disease should be compelled to give a notification of the fact to the health authorities, or other appointed officers, and at the same time exhibit a distinctive flag or written card to that effect.

Croup is credited with one hundred and sixty-four deaths during the year, being nearly half as many as died from diphtheria. As the evidence accumulates we are approaching the time when there will be no distinction made between diphtheria and membranous croup, their identity being firmly established. We notice in our reports that wherever a death from membranous croup is reported there will be found diphtheria in the neighborhood. This is without exception the rule, and no stronger evidence of their co-relation can we think be found than this very fact.

Scarlet Fever.—The deaths from scarlet fever during the year were sixty in number, which shows how very mild the type was in those attacked, the percentage being a fraction over half of one per cent of the total deaths. The most difficult duty the sanitarian has in this disease is to convince the public in the first place that there is no difference between scarlatina and scarlet fever, that they are in fact one and the same disease. The next difficulty to overcome is to convince those afflicted that they are as likely to have serious consequences ensue after a mild attack of the fever as after a severe one, and that infection can as readily be conveyed by the patient not sick enough to go to bed as by the sufferer from the most malignant type of disease. In consequence of this very general obtuseness of the public we have scarlet fever in our schools, traveling in our street cars and railway trains, playing on the streets, and sitting in our churches and theaters. It will continue until that peculiar something comes in the constitution of the body that determines the type to take on malignancy, and then, when death is sown broadcast, the sufferers will learn the value of isolation, disinfection, and fumigation.

Measles, although prevailing to a large extent, occasioned but thirty-four

deaths. The highest mortality in any one month being in April, when five deaths were recorded; three of the deaths occurred in adults, as a result of capillary bronchitis complicating the disease. If we compare this mortality with that of some Eastern States, we will appreciate how little we suffered from death in this prevalent disease. In the report of the State of New York for 1887, we find that in the three winter months nine hundred and nineteen deaths were reported, and fifteen hundred for the year from measles. In Wisconsin the deaths averaged 2 per cent, in Illinois 2.21 per cent, in California the deaths averaged nearly one fourth of 1 per cent. No part of our State has been exempt from measles at some period or other through the year, but the type was so mild and the meteorological conditions so favorable that, as is seen above, death rarely ensued except from some secondary cause.

Whooping Cough caused as many deaths as scarlet fever and a few over, sixty-four deaths being attributed to it. They all occurred in children under five years of age. It has occurred during the year in various parts of the State, and was quite prevalent during the winter and spring months. In some localities it was epidemic.

Cholera Infantum was the cause of two hundred and sixteen deaths. That this disease depends much upon meteorological conditions and the result of heat upon food, we will endeavor to show by recounting the deaths by months of the fiscal year. In July, the deaths were forty-seven; August, twenty-nine; September, twenty-seven; October, sixteen; November, ten; December, eight; January, three; February, three; March, one; April, six; May, fourteen; June, forty-three. It will thus be seen that as the summer and autumn season waned, so did cholera infantum, and when the temperature began to rise in April, cholera again appeared in increasing numbers on our mortality list, and attained its maximum in June and July, the warmest months in California.

Diarrhœa and Dysentery prevailed to a greater or less extent in every part of the State, but nowhere in what might be termed an epidemic form. They produced only one hundred and eighteen deaths, not quite $1\frac{1}{2}$ per cent of the total mortality, which is strong evidence that the diseases had no malignancy in their character. We have no doubt the frequency of these diseases could be materially lessened if those suffering from them had taken even ordinary precautions to avoid the cause. Much of it was undoubtedly provoked by insanitary conditions; by decaying vegetable and other garbage polluting the water used for drinking purposes; by exposure during the summer season in sleeping out of doors upon the damp ground; by eating quantities of unripe and too ripe fruit; by overheating and then drinking large quantities of iced or very cold water. People that avoided these sources of bodily disturbance and stomach disorders did not suffer from diarrhœa or dysentery, although living under the same meteorological conditions and exposed to the same thermal inconveniences. Fortunately for those attacked, the type was particularly mild, and readily yielded, in the great majority of cases, to simple household remedies, or the greater skill exercised by the family physician.

Typhoid Fever.—Two hundred and eighty-nine deaths were reported as being caused by this undoubtedly prevalent disease. If to these we add the twenty-one deaths ascribed to what is called typho-malarial fever, which is now generally conceded to be typhoid fever running a somewhat different course from the ordinary enteric fever, we have a sum total of three hundred and ten deaths from the disease, or 3 per cent of the total mortality. The largest number of deaths, forty-five, occurred in October. In August there were thirty-six, and in September and November twenty-

eight each. The remaining decedents varied from fourteen to twenty-two monthly. This is a very small mortality, and testifies to the mildness of the fever; indeed, there was no tendency to epidemicity, the cases being all sporadic and endemic. The diffusion of knowledge by the State Board has, it is believed, put the public upon its guard against the spread of this fever by causing the adoption of strict measures of disinfection of all the excretions of the sick, and having a careful regard to the sources of the drinking water, as it is in the vast majority of cases due to polluted water that the fever arises. It is true that with a large class of persons it is difficult to make them believe that bright, clear, sparkling water could carry within it the seeds of disease and death, or that such water could be contaminated by seepage of house slops or outhouse drainage. The Board, however, has hope that by continuance of precept upon precept and line upon line, to so educate the great mass of intelligent people in California to the fact that typhoid fever is a matter of choice and determined by sanitation that in the near future, insanitary dwellings and surroundings will be the exception and not the rule, and as a consequence the elimination of typhoid fever as one of the causes of our mortality. There are few diseases whose origin is more certainly known, and with this knowledge we ought to be able to remove the cause.

Smallpox.—For many years the State was free from smallpox, but in February, 1887, it was introduced from Mexico into Los Angeles, and there caused sixteen of the deaths recorded from the disease. In June we find that two deaths occurred in San Francisco, where the disease was introduced by the Chinese. Up to this time it had not infected any other parts of the State.

With this partial review of the causes of death in the fiscal year 1886-7, your Board will learn that the State presented a very healthy condition of its inhabitants. Its mortality was small, it was free from any dangerous epidemic disease, and the work of the State Board was becoming appreciated by the public. We will now present for your approval a—

REVIEW OF THE FISCAL YEAR 1887 AND 1888.

We find recorded during this period twelve thousand three hundred and twenty deaths. The average population being six hundred and eighty-four thousand three hundred and twenty-two per month, and the average deaths one thousand and twenty-six, the percentage would be 18; but if we add six thousand deaths not returned, which is a large estimate, our death rate would average for the year 14.6 for the whole population, which is a trifle over the calculation for 1886. Owing to the slight increase of deaths, we find that—

CONSUMPTION

Caused one thousand eight hundred and thirty-two deaths, an increase of two hundred and fifteen over the previous year. This may be accounted for by the large immigration into the State during the year—seven hundred and eighty-two of the deaths being among foreigners; five hundred and eighty-three in persons from the Atlantic States. Only three hundred and fifty-five died that were born in the Pacific States. We thus infer that the increased mortality from consumption was among those who sought our equable and invigorating climate in the vain hope of restoration to health.

PNEUMONIA

Also shows an increase in deaths, one thousand and thirty-nine being recorded, an increase of four hundred and twenty-eight over the record of 1886. We can account for this record when we remember the increased area of the State heard from and the larger population reporting. The disease was quite prevalent from October, 1887, to June, 1888, in most of the coast towns, and was especially noticeable in San Francisco. It was not epidemic anywhere in this State, but was observed as occurring in sporadic form with great frequency.

BRONCHITIS

Caused two hundred and sixty-two deaths, which is also a larger mortality than the preceding year, one hundred and forty-five being infants under one year of age. The disease, therefore, was not prevalent nor fatal to any extent among the old, where its lethal effects are chiefly felt, only thirty-six persons over fifty years of age succumbing to it.

DIPHTHERIA.

During 1887-8 the number of deaths reported were three hundred and fifty-eight, which, added to two hundred and three from membranous croup, makes the sum total of mortality from these twin diseases five hundred and sixty-one, which is very little in excess of the mortality of the preceding year.

WHOOPIING-COUGH,

Although quite prevalent, caused but forty-two deaths—evidence of the mildness of the type or the constitutional robustness of those attacked. It prevailed more particularly during the spring and summer months, when the weather was most favorable for its treatment by outdoor exercise.

SCARLET FEVER,

Although quite prevalent in many parts of the State, preserved its mild type and endemic character. Fifty-nine deaths were recorded from it during the year. The months of its greatest fatality were January, March, May, and June, which is strong evidence that meteorological conditions play but a small part in the etiology of the disease, and that its fatality depends more upon the constitutional condition of those affected and the virulence of the poison imbibed than upon the question of season or condition of the weather.

MEASLES,

During the year, became epidemic in many places, and was especially prevalent during November, December, January, February, March, and April. The number of deaths recorded for the year was one hundred and thirty-nine, which indicates the extent of its prevalence and the pernicious effect of winter weather upon its results, as we find that in November there were but four deaths, in December eighteen, in January thirty-five, in February twenty-three, in March twenty-eight, in April thirteen, in May six, and in June two. There were twelve deaths in adults between twenty and forty years of age, the remaining one hundred and eighteen being in children under ten years. As the epidemic was scarcely severe enough to ex-

haust all the susceptible material, we may expect a recrudescence of the malady during the coming fall and winter months.

SMALLPOX.

Smallpox, as before stated, made its appearance early in 1887, and during the fiscal year to June 30, 1888, caused ninety-four deaths. The greatest mortality was during the months of December, January, February, and March, when seventy-five deaths occurred. Only two deaths were reported in May and none in June. There were other deaths from smallpox in the State that were not reported. In Calaveras County smallpox was quite prevalent, and several deaths occurred from it, but were not reported, as, unfortunately, our registration law is in such condition that no penalty can be enforced for its disobedience. If this type of the disease had not been of the very mildest character, and devoid of any epidemic tendency, the spread of the disease would have been unlimited, and the death rate consequently increased.

CHOLERA INFANTUM

Caused two hundred and fifty-one deaths, the largest mortality in any one month being in October, 1887. This was owing to the very abnormally warm weather during that month. In the northern end of the Sacramento Valley, according to the Signal Service reports, the temperature was nine degrees above the normal for the month. The deaths in October were fifty-one. In November, when the temperature was lower, but still warmer than normal, the deaths decreased to twenty-five, and in December, when the temperature was only one degree warmer than normal, the deaths were recorded as eight, and in January had fallen to five. Temperature has, therefore, an undoubted influence in the evolution of cholera infantum, and, when combined with insanitary surroundings, has much to do in determining its fatality.

DIARRHOEA AND DYSENTERY

Were quite prevalent throughout the year, and occasioned one hundred and fifty-nine deaths. These diseases were generally observed to be of a mild character, and readily controlled by suitable remedies. The greatest fatalities occurred in October and November, when the weather was abnormally warm, and it seemed, as in cholera infantum, to determine the increased death rate.

SCARLET FEVER,

In an exceedingly benignant form, was present in various parts of the State; it produced only fifty-nine deaths that were so reported. The greatest mortality was in January, when ten deaths were reported. There were nine in March, May, and June, which indicates that temperature has but little influence in determining the result of the disease. There was no epidemic tendency manifested in those places where the disease was observed, and the deaths that occurred were oftener from the secondary results appertaining to the disease than from the malady itself.

TYPHOID FEVER

Was a little more prevalent during 1887 and 1888 than in the previous year, the deaths being four hundred and fourteen—an increase of one hundred and twenty-five; but this may be accounted for by the increased

number of precincts heard from, and the consequently increased estimated population. The largest number of deaths was in the winter months of November, December, and January, when fifty-eight deaths were recorded for each. In August, September, and October, the average was thirty-one in each month, and was only exceeded by June, when thirty-seven deaths were reported. We are led to conclude that local conditions determined the result in these cases, rather than the season; as usually the frequency of the disease and its fatality is greater in the fall than in the winter, although it has been remarked in San Francisco that the advent of the rainy season increases the disease, and that during the winter months there is experienced the greatest mortality.

CEREBRO-SPINAL FEVER

Is credited with one hundred and forty-four deaths. The cases were all sporadic, and occurred in different parts of the State; as far as learned, there was no tendency to epidemicity, which is one of the characteristics of cerebro-spinal fever in its infective form, and therefore it is open to doubt as to whether the disease was properly classified or not. Eighty of these decedents were under five years of age, which increases our doubt as to the correct nomenclature.

MENINGITIS.

We find that under this head there were recorded two hundred and eighty-nine deaths, of which one hundred and ninety-four were under five years of age, and ninety-five over that age. This classification includes the tubercular as well as the purely inflammatory form of disease, and no deductions can be drawn as to their relative frequency, except by considering the age of the decedents.

Before concluding this report, we must call the attention of the Board to the fact that, as yet, no work has been done upon our—

MINERAL SPRINGS.

The mineral springs of this State, containing, as they do, every quality of water that has made the continent of Europe so famous, are now hardly known outside the area of their distribution, and for the simple reason that no reliable and State analysis has been made to determine their medicinal properties. Some of our springs have such a reputation within the State that they are visited from all quarters of it, and hundreds derive the greatest benefit; again they are visited by those whose maladies are not benefited by the waters, but rather aggravated. Such cases are not only injured themselves, but they do injury to a valuable remedial agent, by decrying as valueless what, under judicious selection, would probably be of great service.

Four years ago, through the instrumentality of your Board, a State Analyst was created by law. The State Board was to receive all waters desired to be analyzed, transmit them to the State Analyst, get his report, and transmit it to the sender as an official document containing the result of the water analysis. Some samples of waters were so sent, but the Analyst declared that his time was so occupied in the affairs of the University of California that without assistance it would be impossible for him to undertake an analysis of the mineral waters of the State. Under these circumstances it is hardly necessary to remind your Board that the mineral springs remain unanalyzed, to the great detriment of the State, as our mineral springs

are of undoubted value, and, if their medicinal properties were properly placed before the public, would induce a large immigration of those valetudinarians who now seek European shores in search of medicinal waters that are at their very doors, which only need analysis to determine their value. We would therefore recommend that your Board take active measures, through your Legislative Committee, to place this matter before the Legislature, and ask that a sufficient sum be placed in the appropriation bill to enable the State Analyst to employ sufficient assistants to thoroughly analyze the principal mineral waters of the State and determine their quality. It is a matter of such extreme importance to the community that no difficulty should be experienced in getting the amount sought for.

YELLOW FEVER.

This disease having appeared in an epidemic form in Florida and adjacent States, and emigration coming steadily over roads likely to carry yellow fever-smitten passengers into this State, Governor Waterman, with that care for the welfare of the State so characteristic of the man, requested your Board to take such steps as deemed prudent to guard against any possibility of the conveyance of the disease into California. Accordingly at the next meeting of the Board, Dr. S. S. Herrick, of San Francisco, was appointed to visit the southern portion of the State and determine exactly where the danger lay, if any existed. He was also instructed to visit the Mexican ports in contiguity to us, and ascertain whether any yellow fever existed there, and to report at once in accordance with these instructions. Dr. Herrick immediately left San Francisco, and having made the required inspection forwarded the following report:

Dr. G. G. TYRRELL, Secretary State Board of Health:

DEAR SIR: Having finished my tour of inspection in the Mexican State of Sonora, and returned thus far to consult with Dr. Orme, I am now ready to continue my report from the date of leaving Los Angeles.

On the night of the fifth instant I stopped off at Tucson, where I met Drs. J. C. Handy, H. Spencer, and H. W. Fenner. Dr. Handy is the local surgeon of the Southern Pacific Company, and was formerly an Assistant Surgeon in the United States Army. He testifies that cases of yellow fever occurred at Tucson in 1883, 1884, and 1885, but no case originated here, all having sickened, or contracted the disease, before arrival. He believes it impossible for the fever to obtain a foothold here, so as to spread, on account of the altitude (2,390 feet), cool nights, dry air, and distance from the sea. Dr. Fenner believes there is no danger of yellow fever effecting a lodgment here, on account of the altitude and distance from the sea, but thinks an inspection station should be established on the border to prevent the introduction of yellow fever and smallpox from Mexico, which might even reach Los Angeles. He instanced an opera troupe which suffered from yellow fever severely at Hermosillo, in 1885, and came to Tucson with all their effects. No disinfection of their baggage was made, and yet no yellow fever followed. Most of the cases at Tucson were railroad employes, who contracted the fever in the Mexican State of Sonora. No permanent resident of the town has it.

Dr. Spencer mainly confirmed the above statements and views, but believes that yellow fever might become epidemic at Tucson, provided it gained a firm foothold; it would be dangerous to introduce a large number of cases. He does not consider the nights cool enough to prevent the spread. (At present the daily range of temperature at Tucson is about 58 degrees to 92 degrees.) In 1884, he states that the Southern Pacific Company established an inspection station a few miles east of Tucson, to guard against yellow fever from Sonora and the Rio Grande region. There trains halted and passengers were examined.

Dr. Handy states that smallpox has occurred frequently at Tucson, but mostly among the Mexicans and Indians. At present there is none at all.

On the train from Benson to Nogales, October seventh, I made the acquaintance of the General Superintendent of the lines from Benson to Guaymas, Mr. H. T. Richards. He stated that yellow fever reached Nogales in 1883, 1884, and 1885, from Guaymas. No cases originated at Nogales. The fever died out late in 1885, and none has existed along the lines since. Most of the freight going north by the railroad consists of ores from the mines of Arizona and Sonora. Some dry hides, not exceeding thirty carloads annually, are shipped north, destined for New York and other eastern cities. The conductor of the

train stated that Messrs. Rosenberg & Metzler have warehouses for hides at Nogales and Benson. From another source I learned that most of the hides from Sonora are shipped at Guaymas to go by sea to San Francisco. Drs. Gregory and Goodwin, of Nogales, agree in the statement that no cases of yellow fever have originated there, though a good many occurred in 1883, 1884, and 1885. The altitude of Nogales is three thousand eight hundred and sixty-nine feet above the sea. Its daily range of temperature at present is from 50 degrees to 55 degrees, to above 90 degrees. Snow and ice occur every winter. Last winter it was unusually cold, and the lowest temperature was 14 degrees.

At Hermosillo, capital of the State of Sonora, I had interviews on October ninth and tenth with Messrs. Belisario Valencia, Private Secretary to the Governor; Mr. Calderon, a merchant, and in 1883 member of the Sanitary Board; and Doctors Monteverde and Aguilar. Their concurrent testimony is that yellow fever reached here in 1883 for the first time, coming from Guaymas. There was some disposition on the part of the Health Board, said Mr. Calderon, to quarantine against Guaymas, but the influence of the latter city caused the idea to be abandoned. The fever reappeared in 1884 and 1885, but was successively less prevalent and less severe, and there has been none since 1885. Very few of the population who remained escaped an attack. Even the Yaqui Indians showed about the same susceptibility, but had it with less severity than white people. Mr. Calderon states that the Chinese escaped entirely at Hermosillo.

In 1887, a very mild but sweeping febrile complaint called "sardina," prevailed at Hermosillo. The fever lasted two or three days, was attended with severe pains in the head, back, and limbs, frequently with a cutaneous eruption, and sometimes a relapse. I have no doubt that it was the same disease known in the Atlantic and Gulf States of the South as "dengue" or "break-bone fever."

There has been no smallpox at Hermosillo for two years, but diphtheria exists to some extent. Asiatic cholera prevailed along the west coast of Mexico and reached Hermosillo in 1850, lasting until 1851.

Dr. Monteverde believes that some cases of yellow fever in 1883 originated at Pesqueira, a railroad station twenty-four miles north of Hermosillo, but that this was the extreme northern point of possession by the disease. It declined in severity and prevalence each successive year, until its final disappearance in 1885. Dr. Monteverde was supplied by Dr. Carmona, of the City of Mexico, with his virus of the supposed microbes of yellow fever, and used the same hypodermically in the late visitation; but he found no advantage either in the prevention or mitigation of the disease.

Hermosillo has a population of about eight thousand, is ninety miles north of Guaymas, and six hundred and eighty feet above the sea. In winter there is usually some light frost. Last winter it was cold enough to injure the new growth of young orange trees and cause a fall of the leaves. The water is derived from wells, about eighty feet from the surface, and has a saline taste. Most of the rain in Sonora falls in July, August, and September, but this year none has fallen since August, and a severe drought is apprehended.

At Guaymas most of my information was obtained from Dr. P. Figueroa, who is at the same time Mayor, Health Officer of the Port, Physician to the City Hospital, and Surgeon to the Railroad Company, besides being a private practitioner, consulted far and wide.

All vessels from other ports are visited, and if from infected ports, or coming with contagious disease aboard, are subjected to detention of ten days for observation. There is no quarantine establishment prepared to disinfect vessels and their cargoes; no facilities for transhipment of cargoes. Passengers might be landed and kept under observation in tents ashore, about six miles from the city.

There is no direct communication between Guaymas and the Isthmus. Pacific Mail steamships come to Mazatlan. The steamships "Newbern" and "Alejandro" connect Guaymas with the Mexican ports on the Pacific, and with La Paz on the Gulf of California. Freights to Guaymas from Mexican ports further south consist chiefly of coffee in sacks, manufactured cottons, soap, and sugar.

In August, 1883, the Pacific Mail steamship "San Juan" brought goods from Panama to Acapulco, Manzanillo, San Blas, and Mazatlan, and passengers from San Blas to Mazatlan. Yellow fever soon broke out at Mazatlan, and almost immediately at Guaymas, and soon extended from the former to San Blas, Manzanillo, and Acapulco. The infection is supposed to have been brought to Guaymas and La Paz by the steamship "Newbern," which landed passengers and goods from Mazatlan—some of these passengers having come on the "San Juan" from San Blas to Mazatlan, on which vessel they probably contracted the fever. This was its first appearance, I am informed, on the west coast of Mexico since 1836, when it existed at Acapulco.

Being a strange disease, its nature was not at first recognized nor its proper mode of treatment understood. Its spread was rapid, and most of the population of Guaymas had it in 1883, with no exemption of age or race. Even the Chinese at Guaymas had the fever, but none died. Natives suffered far less than strangers from Europe and the United States, and less than natives of Sonora outside the city. The estimated ratio of mortality, taking all classes for the three years, was 5 per cent, which is unusually low. During the season of 1885 it seemed to die out, partly for want of subjects and partly from diminished activity of the infection.

Since 1880 a fever, variously called "sardina," "tonto," and "alfombrilla," has several times prevailed at Guaymas. It is supposed to have been introduced from Mexican ports further south. The description answers clearly to the well known "break-bone fever" of the southwest.

For two years the Central Mexican Government has been giving the local authorities

information of infectious diseases occurring either in foreign countries or in any port of the republic. By means of the international code of signals, a vessel from an infected port is made out from the lighthouse at Cape Haro, nine miles from the city, and can be ordered not to come inside the harbor. There is telegraphic communication along the coast from Guaymas to Mazatlan, San Blas, and other Mexican cities southward, so that they could be warned of the existence of danger at any other point; and Dr. Figueroa has promised to give the State Board of Health of California timely warning of danger on the Mexican coast, whether in the shape of yellow fever, cholera, or smallpox. On the other hand I have promised that he shall receive the monthly reports from your office and from the Health Office of San Francisco, as well as warning of any imminent danger from infectious disease. Here it is important to remark that during the whole course of smallpox at San Francisco in 1887 and 1888, even when proclaimed as epidemic by the Health Department of the city, the steamships "Newbern," "City of Topeka," and "Montserrat" brought clean bills of health from San Francisco to Guaymas, as I was informed by Dr. Figueroa.

In 1885 and 1886 smallpox existed at Guaymas, but there has been none since.

Dr. Figueroa has used the inoculation of the supposed virus of yellow fever for its prevention, according to Carmona's method. The urine of a yellow fever subject is concentrated by evaporation, without heat, and when needed for use is diluted with distilled water, without being precise as to strength. The dose is 15 minims, by a hypodermic syringe. Sometimes the result was an abscess, with no other effect. Ordinarily there followed fever for two or three days, with moderate headache and backache. The experiment was tried on about one thousand soldiers, who were soon ordered to march to the Yaqui district, and it was impossible to trace up the results. Dr. Figueroa believes that a portion thereby obtained immunity, but those attacked enjoyed no advantage in mildness of the attack. As to prevention, this must be quite conjectural, for they might have escaped without the inoculation.

The population of Guaymas is about five thousand, and is believed to have diminished since the appearance of yellow fever in 1883. The water supply is derived from wells forty to fifty feet in depth, just outside of the city, which is brought in small tanks on wheels, and in leather bags on the backs of donkeys. It is saline to the taste. The railroad company have a limited supply from wells at a greater distance, pumped into a reservoir and piped to their buildings. There are no sewers. Privy vaults are emptied at night by open vessels, in primitive fashion. There is no systematic inspection of premises. Complaints of nuisances may be made to the police authorities.

In ordinary winters there is no frost, but last winter there was a little ice. At the present time the daily range of temperature is from about 80 degrees to 94 degrees.

Respectfully your obedient servant,

S. S. HERRICK, M.D.,
Special Inspector.

As the report of Dr. Herrick indicates that there is no danger this year from any inroad of yellow fever from Mexican towns adjoining our boundary, the President did not think it necessary that a visitation should be made farther down the coast. Dr. Herrick is, however, of the opinion that hereafter it will be necessary for us to ascertain the condition of those Mexican ports that are in close communication with us by sea, as yellow fever is endemic among them, and even when developed it is almost impossible to ascertain the truth from the shippers, or even the inhabitants.

During Dr. Herrick's visitation south it was ascertained that the shipment of nursery goods, such as plants, trees, etc., did not take place from Florida until February and March, when they had been exposed to the frosts that are supposed to destroy the fever germ; hence no danger is to be apprehended from this source. The approach of winter will remove all danger from passenger travel, and all trains up to that time will be closely watched to prevent any fever-stricken passengers from entering the State.

CONTAGIOUS DISEASES AMONG ANIMALS.

The attention of the Board is called to the prevalence of contagious diseases among cattle, which exist in some parts of the State. Splenic fever, anthrax, and actinomycosis are among those affecting the cattle, and glanders the horses, and as such diseases are particularly dangerous to human life, the desirability of making some provision for the investigation of such cases is apparent. This can best be done by the appointment of a State Veterinarian, who shall have authority to investigate into the pres-

ence of such diseases, and take the requisite steps for the restriction and control of such animals as may be found affected by contagious maladies. A law to this effect should be immediately passed, containing among its provisions one for the partial compensation of those whose horses or cattle it may be necessary to destroy, as their destruction otherwise would involve the State in endless litigation. The law should also provide that the appointment of this veterinarian should devolve upon the State Board of Health, which would remove it from the arena of politics, and insure the appointment of a man for his superior qualifications, and not for his political affiliation. He should be compensated while in the actual service of the Board, and be required to visit at any time any county suspected of containing diseased animals, and report immediately to the Board.

As confirmatory of these remarks, we will here append a letter from Dr. Herrick, as supplementary to his report on yellow fever. Dr. Herrick had been instructed by this Board to make diligent inquiry into the question of cattle disease in California, with a view to our Board urging the necessity of some legislative action in the premises if a sufficient cause therefor existed. By this report your Board will see that disease among cattle does exist in California, and that the sooner a State law is enacted for the proper inspection of the food-supply of our people, the quicker will be the removal of many diseases, the source of which has hitherto remained unsuspected:

Dr. G. G. TYRRELL, Secretary State Board of Health:

DEAR SIR: Continuing now from the end of my previous report, I would say that Dr. Joseph Kurtz, of Los Angeles, on the eighteenth instant informed me that he treated two fatal (walking) cases of yellow fever at the Sisters' Hospital in August, 1885. They had been in the State of Sonora, Mexico, on business, and sickened before arrival at Los Angeles.

Dr. Orme is of the opinion that in case an inspection station is to be established on the Southern Pacific Railroad in the direction of Yuma, the proper place would be Cabazon, one hundred and fifty-six miles northwest of Yuma, and about one thousand seven hundred feet above sea level.

October twentieth a butcher of Los Angeles stated to me that cattle affected with bloody murrain and Texas fever had come into the city within a few weeks, but there were none at present. It is to be noted that he wished employment in looking up diseased cattle. This is the only hint of such a thing about Los Angeles. This city has no public abattoir and no meat inspector.

In an interview with Dr. R. W. Hill, of San Pedro, October twentieth, he stated that he had made to Dr. Orme an offer to inspect, without charge, all vessels arriving at this port, if authorized to keep boarding-house runners from first visiting them; and he would report to the State Board of Health all contagious disease found aboard. He could undertake the care of cases of smallpox, if desired. The danger is from small sailing vessels—coasters. There were sixteen deep water ships at this port the previous week, and eighteen the week before. Dr. Hill had heard of no diseased cattle in that vicinity. There is no smallpox at present, but there were some cases six months ago.

Going ashore at Santa Barbara on the evening of October twentieth, I communicated with Mr. W. R. Broome, a large dealer in cattle. He stated that there was, some time ago, a small amount of disease among the cattle of Ventura County. At present he hears of none there nor at any place south of San Luis Obispo, but hears of some in this last county. Mr. Broome always quarantines newly purchased cattle before mixing them with his other stock. He would be glad to receive circulars of instruction from the State Board of Health relative to the treatment of diseased cattle.

Mr. I. K. Fisher, a cattle dealer of Santa Barbara, states that no disease has existed among the cattle of this county for several years. About twelve years ago the Texas fever was introduced by cattle driven from that State through Sonora and Arizona, and has existed here and there most of the time since. It is rapidly fatal, and is the disease most dreaded by stock men. "Blackleg" was introduced about three years ago, from some quarter unknown to him. It affects the limbs from the foot upward with enormous swelling. It has been treated by the hypodermic injection of some nostrum. "Pink-eye" has also prevailed to a limited extent since two or three years ago. He is ignorant of its origin.

At San Luis Obispo, October twenty-first, I met Mr. C. J. Bromley, who has a cattle ranch seventy-five miles to the eastward. He has observed four or five cases of "big-jaw" (*actinomyces*) among his herd of about one thousand cattle. It has existed two years, but he has lost no cases. Has not separated them from the others. Intends to kill them.

Mr. E. Baker, a cattle dealer living at San Luis Obispo, knows of no disease among cattle in this vicinity at present, and has heard of none for a year, though he spends a

great part of his time among the ranches. He has not heard of any such trouble in Monterey County.

At San Francisco, October twenty-second, in company with Dr. Thos. Bowhill, V.S., now in the service of the City Board of Health, I visited several dairies on Mission Street, and afterwards the slaughter houses at Butchertown. No diseased cattle were found. It is generally admitted that the condition of beef cattle has improved since Dr. Bowhill went on duty, ten days ago.

Some butchers deny that any diseased cattle have been slaughtered and sold here for food; others admit the fact, particularly as regards "big-jaw." All maintain that no diseased cattle are brought here at present.

October twenty-third I accompanied Dr. Bowhill in a visit to several dairies beyond the thickly populated part of the city. Among the cows of four dairies we found four cases of "actinomycosis" well marked, three less marked, and one case of advanced tuberculosis.

October twenty-fourth I visited a number of pork shops in Chinatown, in company with Dr. Bowhill. We found many lungs and livers tuberculous, and one case of hydatids of the liver. All these organs were condemned and destroyed, but it is obviously impracticable to discover all that come to Chinatown, or that are elsewhere offered for sale.

Large numbers of hogs belonging to butchers and to Chinamen are fattened on the offal of slaughtered animals at Butchertown. They are kept in close, dark, and filthy pens underneath the slaughter houses, and fed on offal for six to twelve months before they are killed. Most of them become sick, when first put under these conditions, and a good many die. It is not strange that the viscera of such hogs become diseased, and it is clear that pork fattened in this way is not a desirable article for human consumption, whether the viscera be healthy or not.

My visit to Petaluma was occasioned by reports of diseased cattle there, and of the shipment of tuberculous cows from the city to that place, for concealment. On arriving there, October twenty-sixth, I called on Mr. William A. Lewis, who lost five cows out of about forty in the early part of September. They were fed on green corn and the stalks, which had previously been chewed dry by hogs. All that sickened died in about eight hours. After withdrawing the corn no more sickened. Then the hogs were separated from the cows; corn was again given, and no more cows sickened. There was no disease among the hogs.

Dr. Thomas Maclay, V.S., who has resided three years at Petaluma, confirmed the account of Mr. Lewis. Post-mortem examination of the cows showed impaction of the dry cornstalks in the third stomach and inflammation of the cerebral meninges. His explanation is, that the impaction and irritation of the stomach by the sharp points of the cornstalks caused reflex action upon the cerebral meninges and death with head symptoms. About three months ago he saw at a dairy a solitary case of actinomycosis, which was destroyed, by his advice, and the carcass was buried. He heard of two or three other cases at a certain dairy about two months ago, but did not see them. He has heard of no other cases of contagious disease among cattle. Liver-fluke has prevailed among sheep feeding on wet grounds in this valley, and considerable numbers have died. Their carcasses have been left to the buzzards.

Dr. Maclay is a regularly educated and well qualified veterinary surgeon; is very obliging, and greatly aided my investigations.

Dr. J. H. Crane, President of the Board of Health of Petaluma, states that several individuals here have been in the habit of buying up bulls and old broken-down cows of dairymen. Some have been shipped alive to San Francisco, and others after slaughtering; but none have been purchased lately. This practice is probably the foundation of the report that diseased cattle were supplied to the butchers of San Francisco from Petaluma.

A gentleman who owns a dairy ranch in the vicinity stated that it is customary for dairymen to send their old cows, just before or just after calving, to the city, to be disposed of. They fall into the hands of city dairymen, are milked for one season, and then are sent to the butcher.

The man who attends to the shipment and receiving of freight, at Petaluma, for the steamer "Gould," informed me that no diseased or broken-down cattle have been shipped to the city for the last three months, though this has been practiced. No such cattle have been received by boat from San Francisco.

It can only be conjectured how many of these old cows are tuberculous. It is certain that their conditions for health are more favorable in the country than after their arrival at the city.

At San José, October twenty-ninth, H. A. Spencer, V.S., stated to me that anthrax appeared in a certain dairy two miles from that city, in 1885. Fifteen cows were lost, and the remainder were removed. Some hogs also died, after feeding on their carcasses. The origin of the outbreak was unknown. It was confined to an inclosure of about one hundred and fifty acres. No disinfection of grounds or shed was made, but the place has not been used as a dairy since. Dr. Spencer attended a horse which died of anthrax about September first, near the New Almaden mines, about ten miles from the Tennant ranch. He conjectures that the contagion might have been conveyed from the latter place in bones carried off by coyotes. He has met a few cases of actinomycosis during the last ten years, and one animal thus affected was destroyed a few days ago. In his opinion the recent action of the State Board of Health had produced a marked impression on owners of stock. Dr. Spencer has been the Official Veterinarian of Santa Clara County since

May last, and up to the present time has caused twenty cases of glanders and farcy to be destroyed.

October thirtieth I met a gentleman at San José from Tennant's Station, who reported the sudden death of another of his horses, being the fifth since September twenty-sixth.

A son of Mr. James P. Sargent, of Sargent's Station, informed me October thirtieth that his father lost about thirty-five cattle out of three hundred during the month of September, while pastured on a certain field at Tennant's Station. The cattle were then driven home, where five more died. That particular field of seven hundred acres at Tennant's he stated to have had a history of fatality to cattle for fifteen years. The disease prevailing is undoubtedly anthrax.

Mr. Samuel Rea, living near Gilroy, stated that he has lost thirty-five out of one hundred milch cows during the present season, from a disease which he has not known among them before. They died within a day or two of the onset, or recovered under a purgative treatment. His nephew stated that a disease known as "bloody murrain" had prevailed among the cattle belonging to his father and himself for the last twenty years, when pastured on a certain marshy field of two hundred and fifty acres, two and a half miles from Gilroy. Cases have also occurred in two other fields, wet in winter only, for many years, but not constantly. Their cattle never die this way when kept on the mountains. At least one hundred and fifty of their cattle have been lost in three years, and very few of those attacked recover. One of his neighbors has also lost a few cattle in a similar way.

At Monterey, October thirty-first, the foreman of Hon. B. V. Sargent informed me that a disease called "blackleg" has in former years destroyed a few of the best calves on the ranch, about five miles out, but none have died this year.

Mr. David Jacks stated that he has annually lost a few calves and yearlings of the same disease, which he attributes to plethoria, as it attacks animals in the best condition, and may be prevented or relieved by bleeding and purging.

At Salinas, November first, several individuals testified to the annual prevalence, for a number of years, of a disease called "blackleg," on a field of six hundred acres three miles out, traversed by the Salinas River, which is cultivated in barley. It is therefore pastured only about three months after the removal of the crop. The owner stated that a few cattle had died on it this year—twenty-two out of six hundred. The survivors were removed early in October, and no more had died. He also stated that there are now about eighty horses on this land, none of which have died; though in 1885 seventeen out of thirty horses recently brought from the mountains had died there.

Dr. Tuttle, of Salinas, has made a number of post-mortem examinations of cattle dying on this tract, and in every instance he found the spleen enormously enlarged and softened. One of his fingers bears the scar of malignant pustule contracted in this work, and he relates a much more serious case treated by him.

I remained at Gonzales three days, investigating the malady which has prevailed there for years, in conversation with many individuals. It appears that a disease called "blackleg," or "bloody murrain," has annually occurred on a tract of eleven thousand acres since 1876. The land has been cultivated in wheat and barley since 1874 or 1875, and one individual stated that the disease appeared before grain grew there. It first made its appearance along the river, which forms the western boundary, has gradually extended eastward across the valley, and within the last two years has invaded the foothills. The general opinion is that the disease is confined to this tract, though there is some testimony to the effect that the tracts on the north and that across the river have been reached. Its prevalence is confined to the periods of pasturage upon the stubble, August, September, and October, and at the time of my visit it had about ceased. Sheep had suffered so severely that none had been pastured there for two years, and this year more cattle and horses had died than ever before. Hogs and dogs feeding on their carcasses had also died. One herd of cattle, numbering one thousand eight hundred, had lost over one hundred. Another of nine hundred, had lost nearly eighty in a month. The survivors were then removed to another stubble field three or four miles further south and stopped dying.

I conversed with two men of Spanish descent, who are in the habit of skinning these dead animals and of helping themselves to as much of the flesh as they choose. They and their families eat it both fresh and after drying, and large quantities of this meat are jerked. In all probability a portion is sold for consumption by people ignorant of its origin. These persons claim to suffer no harm in their own persons or families from such practices. A physician has reported the death of fourteen children in 1884 as attributable to eating such meat, but it is assigned by others to diphtheria. Previous to this year the carcasses were left on the ground, but lately the remains have been burned after skinning.

It was my intention to make one or more post-mortem examinations of dead cattle at Gonzales, but none died after the first day of my three days' stay. The stubble was then nearly exhausted, the cattle were about to be taken off, and the disease was substantially over for the season.

Mr. Mercer and Dr. Bowhill brought away morbid specimens from a previous visit, and submitted them to the examination of expert microscopists in San Francisco, who clearly made out the destructive bacilli of anthrax.

At Salinas I met the partner of Mr. Breen, who lost nearly six hundred cattle out of a herd of thirteen hundred, on a certain ranch near Soledad, during the last ten days of September. It was a rented pasture, and is said not to have had diseased cattle on before this year. Mr. Breen hastily removed them to another tract not far off, and no more sickened. The few that were sick at time of removal died. The disease is said to have

been Texas fever. If so, I know not how it was introduced. It was my intention to clear up this point, but the investigation is here arrested.

The public mind has been greatly exercised of late by reports of diseased cattle, and the demand for beef has considerably diminished. This has been felt by owners of beef cattle, and I found them disposed to speak of "blackleg" as by no means a formidable disease nor more prevalent this year than formerly. Dairymen freely acknowledge their losses, and those not interested in stock raising speak without reserve on the subject. I am satisfied that anthrax is more widely distributed in California than is generally supposed by the public, and that the owners of beef cattle are reticent on the subject. The first step toward applying an effectual remedy is to obtain the facts. Then some legislation may be needed to strengthen the authorities, so that the contagion may be eradicated. It is necessary that the poisoned fields should be thoroughly burnt over, and where the disease has long prevailed, this should be repeated the next year and perhaps the following one. Where the land is cultivated in grain, the stubble can easily be burned as soon as the crop is removed. Where grass alone grows there will be some difficulty, but the richest lands, producing most pasturage, are those most poisoned. At the present writing, November seventh, the excitement has mostly died out, but the subject should not be allowed to rest. The Legislature should make it the business of one or more competent men to learn what fields and buildings are infested with the anthrax poison, and make it the duty of some authorities, State or local, to attend to its eradication. The longer the matter is delayed, the more the difficulty will grow, and at the same time the more urgent will become the necessity for efficient action.

Respectfully submitted.

S. S. HERRICK, M.D.

OUR CORRESPONDENTS.

The increasing number of those to whom we are indebted for means to enable us to furnish this report is so great that it is only through this report that we have the opportunity of thanking them individually and collectively for the very valuable information supplied from time to time to this office. We have particularly to thank those physicians who have so generously furnished us with circumstantial accounts of outbreak of disease in their practice, or under their immediate supervision, and with accounts of investigations that have been made with reference to the causation of sickness, and their modes of prevention. We desire to say that all such communications are received with great pleasure, and are utilized in giving expression to the sanitary lessons which such descriptions teach. We trust in the coming years to still further increase the area of our correspondence until the State Board of Health will be in intimate relation with every town and village in the State, through its local health authorities, or its medical friends. Suggestions from any such, whereby the efficiency of the Board can be increased, or its work extended, will always be welcome, and to those who have given us such efficient aid in the past, and hope will continue with us in the future, we again tender our heartfelt and sincere thanks.

To those gentlemen who have contributed so liberally to the literary portion of our work the Board also desires to express its thanks. Some very valuable papers will be found in our appendix, from writers of national reputation, which will be perused with much pleasure and a great deal of profit.

Our thanks are also due to the Signal Service Corps for meteorological observations, and to Sergeant Barwick, of this city, for a contribution on the climate of Santa Barbara as compared with Mentone and San Remo. The aid which the Signal Service is rendering in determining some problems in the causation and cure of disease is becoming more apparent every year.

THE PRESS.

We are happy to say that the cordial relations which existed between the press and our Board, when its last biennial report was printed, still continues. To its aid we owe much of the success which now attends the Board in its advisory capacity. Although perhaps some apparently just

criticisms have been made upon the reports promulgated through our "Monthly Circular," these were made by those who failed to understand the difficulties under which the Board labors to get any reports concerning the death rate, or the amount of prevailing sickness. The chief fault found with us is in estimating population, and the relative mortality. To these critics we would reply that the population is estimated by the Health Officer or private correspondent, and this Board has no right, having no more correct knowledge, to question the truth of such estimate; neither has your Secretary any right to question the correctness of the deaths reported. When the whole press will aid us in passing such laws as will insure the registration of every death and birth, and in the power of its might compel our legislators to give ear to the requirements of our Board to make it of practical benefit to the public and the State, then if any dereliction of duty occurs, we invite the censure of the press whenever the fault occurs in us, and not in the law under which we act.

As a Board we desire to express gratefully our thanks for the valuable aid the press has always given. The public may thank it in helping us to get an appropriation set apart by the Legislature whereby we were enabled to guard our State against the inroads of disease. Through its instrumentality we were successful in securing quarantine stations in San Diego and San Francisco, and to the press we owe the general diffusion of sanitary knowledge throughout the State that, unaided, this Board could not hope to have known under its present restricted power.

We are now entering upon that era of the world's history when men are becoming convinced everywhere that health and longevity must be governed by laws which are inexorable, and that those who would enjoy perfect health must render implicit obedience to these laws. In the dissemination of this knowledge our Board is engaged, and, sustained by the press, there can be no retrogression. Preventive medicine will be taught the coming generation, until no man will be considered as skilled in the medical profession who cannot alone cure, but also prevent disease.

CONCLUSION.

In concluding this report, as executive officer of the Board I desire to acknowledge, with thanks, my personal obligations to my co-laborers on the Board, for the assistance they have rendered me in the discharge of my duty, and for the counsel cheerfully given in every emergency. Our actions have been harmonious in seeking the welfare of the State, and we think our past acts will merit public approval. We will, in a brief summary, recount our hopes for the future:

First—We look to our Legislature to continue the Contingent Fund set apart for the use of the Board in restricting or preventing the importation or development of infectious or contagious diseases in California.

Second—We trust to have our health laws so amended that we can have a correct return of the births, deaths, and marriages occurring every month.

Third—We hope to have a law passed making it compulsory to have vaccination successfully performed before admission of any pupil into the public schools.

Fourth—We hope to obtain a law forbidding the interment or cremation of any human body within the State without a proper permit. This we ask to prevent and to detect crime, to insure correct statistics of death, and to have a reliable record for reference, whereby those whose identity

is sought to be established, by anxious friends or for legal purposes, can be obtained.

Fifth—We hope to make compulsory the organization of local Boards of Health in every county and city in California, that in time of great sickness, or in the advent of an epidemic, unification of purpose may be obtained and concert of action had with promptitude and without conflict of interests.

Sixth—We hope to enact a law creating the office of State Veterinarian, whose duty it shall be to take cognizance of all infectious or contagious diseases among domestic animals, condemn them to death when necessary, and prevent the distribution of diseased meat among the people. We are aware that this source of disease is more common than is supposed, and should be made the subject of judicial inquiry. We also will recommend that the Legislature make provision for a small payment in recompense for the animals slaughtered.

Seventh—We will ask the Legislature to vote a small appropriation to enable this Board to have the mineral springs of the State officially analyzed.

These are the chief requirements of our Board, and we would ask our legislators to reflect upon these subjects, and be prepared to vote intelligently upon the propositions. They are all in the interest of the public health, and for the lasting benefit of California.

We append to this report the reports of the committees appointed to visit those institutions drawing aid for their maintenance from the State; also the report of the State Analyst, together with whatever reports we have received from County Hospitals, which are, we regret to say, meager in the extreme. Appended to this report are the expenses of the Board and expenditures for quarantine purposes, vouchers for which are on file in the Controller's office. We also append the names and addresses of our various correspondents, to whom we are indebted for the mortuary statistics that immediately follow; and although, through the inefficacy of the law, they are neither full nor complete, yet they give the public an adequate idea of the general freedom from disease which characterizes California, and impresses the visitor from abroad with a sense of how favorable the climate must be that produces such a limited mortality from climatic diseases.

All of which is respectfully submitted.

GERRARD G. TYRRELL, M.D.,
Permanent Secretary California State Board of Health.

REPORT OF THE STATE ANALYST.

Pure air, pure water, and pure food are essential to the maintaining of health. Whoever introduces impurities into either of these substances may thereby introduce disease and death. The position of the individual citizen in this regard is one of utter dependence and helplessness. The air may be infected with disease germs, but he cannot perceive them—they are not recognizable by either sight, or touch, or smell. The ordinary person cannot discover them by any sense; polluted water may have the appearance of pure water, it may be clear, and cool, and palatable, and refreshing to the taste, and still contain the seeds of disease; food articles may have all the appearances of purity, the dealer himself may believe them pure, and yet they may be adulterated, and even dangerously adulterated. It is clear then that in these matters the State must protect its citizens, because of their inability to protect themselves. This right and duty is conceded in every civilized country. We maintain a rigorous quarantine against infectious diseases, we condemn property, we compel the removal of business, we require every person in the community to avoid the maintenance of a nuisance. The State cares for the water supply and protects it against pollution. In this connection, it should be remarked that everywhere throughout the whole civilized world, greater and greater care is being exercised in this matter, and stricter laws enacted. Two years ago the Legislature of Massachusetts appropriated \$30,000 to the State Board of Health, for the purpose of a thorough examination of and report upon the water supply of the State.

The food question stands very much upon the same basis. The consumer cannot detect adulterations in the food he eats; he cannot with any certainty detect adulteration in the crude materials as he buys them in market. The dealer himself, with all his knowledge of the business, is very often deceived; both consumer and dealer are alike helpless; they alike turn to the State and ask, yea, demand protection from the frauds and dangers which threaten them at the hands of unscrupulous manufacturers and dealers. No argument is needed to prove that the citizen has a right to this protection or that the State is bound to furnish it. This is conceded in all countries and by all nations.

Very active and vigorous and effective measures have been taken by nearly all civilized countries for the complete suppression of trade in adulterated foods, drugs, and beverages. Public attention has been specially called to this subject during the last ten or fifteen years, and it has been during this short period that the most effective efforts have been put forth to stop the manufacture and trade in adulterated food and drugs. If less attention has been called to the subject on this coast, the reason has been that we are pressed with many other problems incident to a new and isolated State. The movement in the East has been slow when compared with the States of Europe. We are so accustomed to let things take care of themselves and so careful not to interfere with the business of the country, that we have almost hesitated to follow the examples of our neighbors on the other side of the Atlantic. We must appreciate the neces-

sity for legislative action before any can be taken. Massachusetts was among the first of the Eastern States to take action on this subject, and after a personal study of their laws and methods, in my opinion, they are the most efficient. I believe that we would do well to be guided by their experience and to follow their example. Food adulteration is a great and growing evil, yes, it is a fraud and a crime committed upon innocent and helpless victims. As a State and community we shall fail in our duty to ourselves and to our neighbors if we do not take an active interest in this matter, and see to it that adulterators of food do not go unpunished.

The adulteration of food is not altogether a new thing. It has undoubtedly been carried on to some extent before our time, but not on so large and grand a scale. An unscrupulous dealer may now and then have attempted to deceive his customers, and increase his own gains, but such dealers were rare, and their attempts at adulteration were clumsily done. We have all heard the story of wooden nutmegs in Connecticut, and that now and then sand had been added to sugar, but no one ever believed that the practice was common, if, indeed, there may have been some truth to start the story. It was left for our time to raise the adulteration of food to a fine art. No one country and no one locality seems to have attained, certainly not to have maintained, a monopoly of this art for any length of time. I know of no contagion that spreads so rapidly and surely. Apparently it reaches all countries and all peoples—at least, those claiming to be civilized.

Adulterations affect the public in a twofold manner; they affect the commercial interests of the country; but this, and of far greater importance, they affect the health of the country. There may be adulterations which do not seriously affect health, but they are nevertheless frauds, and their influence, though felt chiefly in the commercial relations of our people, is baneful. We should not forget that every fraud has a moral effect upon a community, and when countenanced in any way, its influence is widespread and disastrous. It is for this reason, if for no other, that we cannot be indifferent to any adulteration, whether prejudicial to health or not. As a general rule we can leave the solution of purely commercial problems to those most directly interested. Large interests, when interfered with, can usually protect themselves. Combination and association have become so general in our day that the weak individuals are easily transformed into an invincible organization.

The New York Dairyman's Association was able to procure legislation based wholly upon the fact that the manufacture and sale of oleomargarine was prejudicial to their interests. They were right when they denounced its sale under the name of butter. It was not pure butter, and had no right to be called butter, or sold as such.

The adulterations of olive oil and of lard come under this same class. No one claims that they necessarily are injurious to health, but they are being sold for what they are not. It is a safe rule to establish, that every article which does not show what it is, upon simple inspection, shall be labeled correctly and intelligently. If the lard refiners can make an article which is as good, or better, than the pure lard, they are entitled to all the benefit which they can derive from their study, experiment, and skill in manufacture. There may be a legitimate field for investigation and enterprise in this direction.

When Liebig, in 1865, recommended a food for infants, he conferred an incalculable blessing upon coming generations. His profound knowledge of chemistry, and of plant chemistry, and of animal chemistry, enabled

him to recognize a substance which could replace mother's milk. There is a vast field for the application of chemistry to the *improvement* of food, but it ought not to be directed to its *adulteration*.

There is a debatable ground which perhaps should be mentioned. It is one of the triumphs of modern chemistry that a very large number of substances occurring in plants or animals, or extracted or derived from them, have been prepared artificially in the laboratory. Now in very many cases this artificial product is *absolutely identical* with what we may call the *natural product*. I can illustrate by taking certain coloring substances. Alizarine has from time almost immemorial been extracted from the madder. Graebe and Liebermann, two German chemists, prepared it artificially from the coal tar products. The artificial and the natural drugs are absolutely identical, and it is now a matter of but little consequence whether the method of preparation be given or not. Indigo is prepared artificially and is identical with the natural product. Salicylic acid is prepared artificially and I think it is now conceded that it may replace the natural. Perhaps extra care may be needed to insure equal purity. I think it would be no fraud to use the artificial in place of the natural acid. This is an extreme case, yet a clear rule it seems to me can be laid down. The *proof* must be furnished and accepted by the highest authority, and I would add by *official authority*, that the artificial and natural products are the same.

In pharmacy we have the Pharmacopœia, which is the official authority, or rather is accepted as such. In the great majority of cases, however, there will not be found any such debatable ground. In the case of food, which is almost always a mixture of many chemical substances appropriated and organized into a structure under the influence of plant and animal life, we may not expect to reproduce it artificially. The spirit which allows or prompts adulteration, even if that adulteration is not necessarily harmful, is *hostile* to the best interest of society, and easily degenerates so as to countenance injurious practices.

I shall next call attention to the *nature* and *extent* of adulteration as practiced outside of our State. The evidence will be taken from official reports and official examinations made in the East and in Europe.

By a general consent milk is placed first on our list, and more attention has been paid to this than to any other single item of food. It is the diet of young children and of invalids, as well as of older and stronger persons. If it does not contain the ordinary nourishing constituents in the proper proportion, it is not what the buyer has a right to expect; if, on the other hand, it contains foreign and injurious substances, it is a fraud, and may prove very injurious to those who use it.

The one adulterant of all times and countries and people is water. It is the old, old story, that the milkman will add water to his milk. It is a practice which is begun very gradually, as the testimony in many cases will show. The milkman in pouring from one vessel to another rinses out his can or pail and pours the rinsings into the milk. This only has to be done frequently and liberally to dilute the milk very considerably.

In examining the record, it would seem as though the practice was very cosmopolitan and very democratic. No country and no class can lay exclusive claim to it. The milk is watered in small quantities and it is watered in large quantities, it is watered a little and it is watered a good deal. The only wonder is that the community will allow itself to be so imposed upon. Of the adulterants other than water I will not take time to speak. When water is added in such quantities that taste and general appearance are affected, then other things are added to prevent the ready

detection of the watering. Not unfrequently, according to these reports, the milk is skimmed or partially skimmed. The addition of preservatives is not as common as it was a few years ago. For this purpose boracic acid and salicylic acid were used. I shall speak of these in connection with wine, and will now pass them over.

Many and varied are the adulterations that the chemist has to look for, yet few and simple are those usually found in the milk.

The constitution of pure milk has been so thoroughly and carefully investigated that we are enabled to agree upon a standard, and milk which does not come up to this standard is condemned. It may fall below this standard, because it has been adulterated, watered, etc., or it may have been taken from cows insufficiently fed or in a low, lean condition, and if not actually sick, lacking the vigor and strength of health.

All over the world this problem has been met, and the chemist now stands on firm ground and has the support of the communities where he works. I suppose that in no other field has good supervision and inspection accomplished *so many good results*.

In Canada this examination began in 1876, when 58.6 per cent of the milk examined was adulterated. In 1886 the percentage of adulteration was reduced to 11.2 per cent. The same or nearly the same result was given me by the President of the Massachusetts Board of Health; it is the experience of milk inspection everywhere. The very fact that there is such an examination by competent authority goes far to prevent adulteration.

I have before me the report of the Inspector of the State of New York:

	Samples.	Adulterated.
In 1880.....	1,514	11.0 per cent.
In 1881.....	1,110	4.6 per cent.
In 1882.....	1,775	6.7 per cent.

The importance of the subject demands attention, and the most careful attention. The testimony from all parts of the world is practically in accord with that from any particular locality. We simply find it a little worse in one place, and a little better in another. Government examination and inspection limits and goes far to break it up.

A supervision of the milk supply of a large city could do much good, as the testimony shows. The supervision means more than a simple chemical examination, for this, once in force, would naturally be extended to an examination of the condition of the cows themselves, whether healthy or not, and especially as to how they are fed. The exclusive use of distillery swill and refuse beets from the beet sugar factory would then be stopped, and many other evils connected with the milk trade would disappear.

I think I may next mention the adulteration of wine, beer, and liquor. I do not refer to local adulterations, for I believe that, taken as a whole, California wine is the purest wine to be had, but even among our people there are some who are tempted to do what is done on so large a scale in other countries.

The following table is taken from the report of the Municipal Laboratory of Paris, 1885, page 173:

	1881.	1882.
Number samples wine analyzed.....	3,361	5,150
Number samples good.....	357	896
Number samples passable.....	1,063	1,590
Diseased wines.....	6.51%	5.24%
Fortified wines.....	9.55%	7.32%
Wines not pasteurized.....	24.45%	25.47%
Wines pasteurized between 1 and 2 grams.....	52.53%	41.79%
Wines pasteurized more than 2 grams.....	23.02%	33.04%
Watered.....	41.12%	29.15%
Wines colored.....	15.65%	7.66%
Salicylated.....	4.73%	5.00%
Salted.....	.18%	.08%

If we had an analysis of the wines which are being used in the East, I am sure that the honest wine maker and wine dealer would be astonished. Some two or three years ago I received samples of wine which were being sold for medicinal use in some of the best drug houses of the Mississippi Valley. They embraced port, sherry, and catawba wines, specially recommended for medicinal use. A careful analysis showed them to be, beyond all doubt, *manufactured wines*, not made from the juice of the grape, or at most, only flavored with grape juice. We find frequent reports of discoveries by the Health Department of New York of these artificial wineries in the heart of the city where wines are *made*. The materials used are dried apples, dried fruits of the poorest quality, sugar, glucose, grain spirit, etc., with various flavoring substances, coloring matter, etc., to give proper taste and appearance. I believe that the worst adulterations are made in a small way by ignorant and irresponsible persons. It would be impossible to anticipate some of the concoctions which they compound.

I am disposed to speak more fully upon the subject of California wines, because I have had opportunities of knowing a good deal about them. As State Analyst, I have analyzed a large number of wines as they were being marketed. Since the pure wine law went into effect, it has been customary for the wine dealer to require an analysis of the wine to be sure that it was not adulterated before purchasing. As the result of these analyses it will appear that hardly a single wine among the hundreds analyzed was adulterated. I am sure the wines of no other country would show so good a result. There is hardly an excuse for adulterating California wine. Wines are adulterated to cheapen them; they are diluted, and then color and substances to give body and flavor are added, or preservative agents are added (antiseptics, sulphurous acid, or its compounds, salicylic acid, borax, or boracic acid, etc.), or reagents are added to improve taste, color, etc. I think that there is no necessity or excuse for treating our wines in that way. It would be worth everything to us to maintain the reputation of purity for our wines. It is practically conceded to us, and certainly the least we can do is to preserve it. The wine growers are thoroughly in sympathy with this idea, and as a body, I am sure, will heartily support it.

Beer has also been adulterated, and every report of analysts will mention its adulteration. This is most commonly done by substituting some other bitter principle for the hops. Dr. Ure, in Watt's dictionary, says, "as long ago as the reign of Queen Anne, brewers were forbidden to mix sugar, honey, Guinea pepper, *essentia binei*, *coccus indicus*, or any other unwholesome substances in beer." Prussic acid, strychnine, absinthe, and many other poisonous drugs are reported as having been found in beer at various times and places.

The adulteration of distilled liquors is almost proverbial. I will not take time to discuss it here.

I have reason to believe that one of the most adulterated articles to be found in market is the preserved or bottled cider. The attempt to keep any fruit juice like cider or grape juice unfermented, means the addition of antiseptics ninety-nine times in one hundred.

The spices and condiments present special inducements to the food adulterator because of the form in which they are put upon the market.

Instead of the oldtime peppercorn, and allspice, stick cinnamon, and mace, these are ground by large mills and put up ready for immediate use. The modern house servant is far more regardful of his or her convenience than our great-grandmothers, and consequently is more exacting in demanding that everything possible be done for him or her. Nothing is easier than for the spiceman to put in all his dust and waste, and when this gives out to make waste and dust. I am sorry to say that the state of the trade in this branch is most deplorable. The trade is managed as follows: Inasmuch as spice grinding has become a necessity, mills have been erected and maintained for this purpose. They keep spices ready ground, or grind to order. They usually put their own label upon both. The honest and conscientious grocer, who values his good name, says his only protection is to buy the pure, unground article in market and then send it to the grinder, which is returned to him, unless by special agreement, bearing the label of the grinder. Unless I have been very much misinformed, the label which is placed upon these goods conveys absolutely no indication as to their purity. There may be sold, under the same label, goods which are as different as well can be—some pure, some grossly adulterated. As proof of this may be quoted from the bulletin of the Department of Agriculture, by Dr. Richardson, on spices and condiments.

The following advertisements are widely circulated:

— — —, manufacturer of spices, spice mixtures, and mustards, 181 — Street, N. Y. Goods made to order for wholesale grocers and druggists; also grinding done for jobbers who pack their own goods. *Spice mixtures*, cayenne pepper a specialty.

— — —, 17 — Street, New York, manufacturer of all kinds of spice mixtures. My celebrated brand of P. D. pepper is superior to any made. Samples sent on application. Goods shipped to all parts of the United States. *Spice mixtures a specialty*. Spices ground for the trade. We are the inventors of suction coolers.

I find in the "Analyst" of 1883 an item which gives us the meaning of "P. D.:" "At the weekly spice sales in Mincing Lane lately, a firm of brokers proceeded to the sale of six hundred and eight bags (thirty tons) of black pepper dust," etc. Objections had been made the day previous to the sale on the ground that it contained 44 per cent of sand and clay. This gives us some hint as to the meaning of "P. D.," which has come to be a well known term in the trade.

The report gives the following statement of the condition of the trade: "At the present time in several of our largest cities the price to be paid for a spice is named by the retail dealer, and he is then furnished from the spice mill with a mixture containing the largest amount of pure material which can be supplied for the money, the necessary weight being made up of a diluent of some cheap and harmless substance, different grades being distinguished as pure, extra, superior, No. 1, no one of which is pure and many of which are mere variations in labels, and none in quality. As example, the fact that a New York firm, it is understood, in a short time used and put upon the market in their market more than five thousand pounds of cocoanut shells, and the quotation already given in a journal devoted to spice milling, shows how universal and open the custom has become."

A comparison of the reports of those States and countries where food examination is maintained, shows that the majority of samples submitted for analysis were adulterated. Pepper is adulterated with starch, rice, yellow corn, and fresh cracker crumbs, and black pepper perhaps more so than white, although the latter might just as easily be adulterated with rice, cracker crumbs, etc.

SPICES.	ADULTERANTS.
Allspice	Spent cloves, clove stems, cracker dust, round shells or charcoal, mineral color, yellow corn.
Cayenne.....	Rice flour, salt, and ship stuff, yellow corn, turmeric, and mineral red.
Cassia	Ground shells, crackers, turmeric, minerals.
Cinnamon	Cassia, peas, starch, mustard hulls, turmeric, minerals, cracker dust, burnt shells, or charcoal.
Cloves	Spent cloves, clove stems, minerals, allspice, roasted shells, wheat flour, peas.
Ginger	Cereals, turmeric, mustard hulls, cayenne, peas.
Mace	Cereals or starch, buckwheat, wild mace.
Nutmeg	Cereals or starch, wild nutmeg.
Pepper	Refuse of all sorts, pepper dust, ground crackers or ship stuff, rice, mustard hulls, charcoal, cocoanut shells, cayenne, beans, bran, yellow corn.
Mustard	Cereals and starch, turmeric, peas, yellow corn, meat, ginger, gypsum.

It is notorious that ground coffee is mixed with chicory and roasted grains. We have yeast powders of all sorts and kinds, a good proportion of which contain alum. Pickles are sometimes colored with copper; candies are colored with poisonous drugs. The Health Department of New York has seized, condemned, and destroyed thousands of pounds for this reason. Alum is sometimes put in poor flour and bread. Cream of tartar is often either impure or adulterated, and so on through the list. There is all the evidence that could be wished to show that adulteration is widely carried on. The worst and most dangerous cases are probably practiced on a small scale. When an establishment accumulates capital it becomes conservative.

Last year a confectioner in Philadelphia colored his buns yellow with chromate of lead. This was done to economize his eggs. The amount used, however, was so excessive that many persons sickened, and several deaths resulted from eating these adulterated buns.

The adulteration of drugs is, if anything, far more serious than that of food. The physician is left without any guide in administering his remedies, if he is not sure of getting what he prescribes. Reports again show that there is a very considerable amount of adulterations even here. Standard preparations are not up to standard, and sometimes inferior in quality, and even substitutes are employed. Without going further into details, I have presented evidence to establish the fact that adulteration of food and drugs is common enough to call for serious and careful attention on the part of every one. Here is a great evil that we need to be protected against, an evil affecting the business, health, and morals of the State.

As Californians, we have an especial interest in the maintenance of food purity. We are already recognized as one of the great wine producing countries of the world. Our wines are beginning to find markets in good measure because they are believed to be pure. We cannot afford to allow the good name already obtained to be injured by ignorant and unscrupulous persons. The pure wine law enacted by the last Legislature was

simply the result of this sentiment among the wine growers. As a class, and as individuals, they are heartily opposed to any treatment of the wine that could in any way be considered as adulteration. The interests involved are too great to be jeopardized by introducing any doubtful practices even if they promised some temporary advantage.

The olive oil industry in this State is still in its infancy, but it gives good promise of a future here. The adulteration of olive oil in general, is a byword. It is known to everybody that cotton-seed oil is exported from the Southern States in large quantities to be mixed with the olive oil of France and Italy, to be again imported as pure olive oil. It is not claimed that cotton-seed oil is injurious, but it lacks the flavor of the pure olive oil and its admixture interferes with the development of the industry. If the mixed oil is sold for what it really is, and not for what it is not, no wrong can be done. This much of protection every one will be ready to concede towards the development of our infant industries.

Whence is to come this relief and protection? This in good part rests with ourselves. The condition of our trade is not so bad that good, pure articles of food cannot, as a rule, be had. There are intelligent and honest dealers who do the best they can to furnish the pure articles, which their customers require and are willing to pay for, but the pure articles cost more than the adulterated, and the consumer must be willing to pay the difference. The public must realize that there is an evil against which they must protect themselves. They must realize that it is a great and a threatening evil, and that each and every person is affected by it.

The citizens of the commonwealth need to be protected in the enjoyment of their rights; they need to be protected against dangers which threaten life, health, and property, and which they are powerless to resist. The food consumers have a right to demand that when they ask for bread, that they be not given a stone; and when they ask for a fish, that they shall not receive a serpent. One of the characteristics of our civilization is shown in the regard we pay to the helpless and unfortunate. Instead of allowing the weak and the crippled, those diseased in mind and body, to perish in the struggle for existence, the strong help to bear the burden of the weak, and we have seen the poor and sickly child develop under this system of nursing into a healthy maturity. The adulterated food affects most seriously the young and the invalid. We cannot judge of the effect of such food upon the robust man in vigorous exercise, for he can resist or throw off its action, but with the delicate digestion and lowered vitality of the invalid it is very different. They ask and deserve protection. We, the victims, demand protection against adulterations which, even if they are not injurious to health, are fraudulent. This is a wholesale robbery committed upon innocent and helpless victims. If the State has any function which is clearly and distinctly recognized, if it owes any duties to its subjects, surely it has both the right and should feel the obligation to protect against such frauds and impositions.

The honest tradesman and dealer asks protection against such stupendous frauds and deceit. In the fierce competition of business, the man who adulterates can undersell the honest man, and the man who undersells draws customers. The result is likely to be a demoralization of trade. The honest, conscientious man is driven out, or driven to the wall. The public is robbed; trickery, deceit thrive; public morals are degraded; there is no public confidence, no faith, no *esprit du corps*; and, as a consequence, private morals decline and the whole fabric of society is affected with a dry rot. What further legislation, if any, do we need? We have first the United States law in regard to oleomargarine, and a certain inspection of

tea and drugs, when they are imported from foreign States and countries. A pure food bill was introduced into Congress at the beginning of the last session, the object of which was to improve the method of examination by furnishing competent chemists and well equipped laboratories to the various ports of entry, and also to enact stringent regulations against the manufacture and sale of adulterated food, drugs, etc., in the District of Columbia, and in the Territories. This bill is still in the committee, and it is uncertain what action will be taken. Our State law, as it seems to me, is insufficient. The revised Political Code makes it a misdemeanor to knowingly and willfully adulterate and sell adulterated food, etc. It fails, however, because no special provision is made for its enforcement. This is demonstrated by the experience of other States and other countries. Certain fundamental propositions in connection with the enforcement of regulations against adulterations have already been thoroughly established, and may now be accepted as axiomatic. The law should be very clear, leaving no loophole for escape through technicalities. Provision should be made for the free official analysis or examination of any food that any reasonable person may suspect of adulteration. Upon this point there seems to be little difference of opinion. There should be officers who are charged with the execution of the law. In Massachusetts, New York, and Michigan, this general responsibility is vested in the State Board of Health. In New Jersey and Ohio there is a special Food and Dairy Commission. I am not aware what legislation has been enacted by other States. It is clear that some action is necessary. It seems to me that this power and responsibility can well be placed upon our State Board of Health. Whatever body is charged with this work should have authority to appoint Inspectors, or should accept the Health Officers and Inspectors appointed by County and City Boards of Health. These Inspectors should send samples of food bought by them in the open market to the State Analyst for analysis, giving notice at the time what they are doing. As a rule, the request of any private person would be considered, and the Inspectors should see that the article to which attention was called was satisfactorily investigated.

Coöperation between the State and municipal authorities would simplify and assist and economize very much, otherwise it would be necessary for this body charged with the enforcement of the law to appoint and keep their own Inspectors, etc. What we must in any case depend upon is the support of the law by an intelligent and hearty public sentiment. When this condemns adulteration, no honorable firm and no firm with capital at stake will dare to disregard it. When it is known that there is a fair and honorable inspection of foods, the condemnation of an outraged public will supplement the condemnation of the Court. The dealer will be under a ban and he will feel the verdict of the public more than that of the Court. Perhaps it should be said that this work should be done in a conservative spirit. At times in other places it has been charged that this inspection was given to sensationalism, that the officers were sometimes over zealous to parade before the public the importance of their office. A true conservative spirit should be maintained and the interests of the whole community kept in mind.

In conclusion, I ought to say a word in regard to the pure wine law of this State. I believe that, in general, the effect is good. I know that the wine makers have been very careful to comply with the law. They are working with far greater intelligence than ever before. What is needed is a better provision for enforcing the law in regard to the retail trade.

REPORT OF COMMITTEES ON ORPHAN ASYLUMS AND ALMS-HOUSES DRAWING AID FROM THE STATE.

REPORT OF COMMITTEE ON PROTESTANT ORPHAN ASYLUM, SACRAMENTO.

To his Excellency GOVERNOR WATERMAN:

The committee appointed by the State Board of Health to examine into the sanitary condition and administration of the Protestant Orphan Asylum, Sacramento, beg leave to report that having examined the building, its accommodations, sanitary condition, and administration, we find the building, although very old, in fair condition, but entirely too small for the purpose designed.

The number of orphans contained in the institution is one hundred and twenty-five at the present time. The sleeping rooms provided for these, give in the aggregate three hundred and thirty cubic feet of air space for each child, which is wholly inadequate to the requirements of the healthy body. The ventilation of these dormitories is obtained only by opening the windows and doors of the rooms, which should be obtained by other means, so that a constant current of fresh air be admitted without giving rise to drafts, which now makes sleeping in these rooms dangerous to children.

The water-closets on the various floors are fitted with the old fashioned dirty pan closets, which it is impossible to keep free from offensive odor; consequently, from their proximity to the sleeping rooms, they are dangerous to the health of the inmates, and should be removed. Indeed, for safety, all the water-closets should be removed from within the house and erected outside the walls, and properly ventilated to prevent all offensive odor. The closets were, however, as clean and well kept as their defective construction would allow.

We find the dormitories scrupulously clean; the beds supplied with sufficient clothing, and the bedding of good quality—all kept very neatly and cleanly. In each room, or adjoining it, are closets for the children's clothes, which are neatly folded and kept in good order. The children are comfortably clad, and each have a bath once every week, besides which they are washed, face, neck, and hands, daily, the younger ones perhaps oftener. The older children have free access to the wash-room and can wash frequently. We examined the heads and persons of many of the children, but found no evidence of vermin in any. The Matron proudly told us we would not find a louse or a bug in the house, which, as far as our observation could enable us to determine, was true.

The children upon interrogation had no complaints to make, physical punishment being the exception and not the rule in the institution.

The diet of the children consists of bread, butter, tea, and hash or mush for breakfast; meat, soup, vegetables, and fruit for dinner; and bread, utter, and tea or water for supper.

The dining room in the basement is large and airy, kept very clean and neatly furnished. The assistants in the house have a separate dining room. The kitchen is detached, comfortable, and attended by two Chinese cooks. They consume daily one hundred and fifty pounds of flour in

bread making, the bread being light, white, and wholesome, and well baked. In the cellar we found abundant supplies of fruit, vegetables, and milk. The meat is bought daily as required. Seven cows supply the milk; the animals are kept on the premises and carefully tended.

The children's small play rooms are in the basement, and in these an hour's religious worship is held daily. In the yard some half dozen closets have been erected, under cover, for boys and girls; they are not of good pattern, and some of them not in working order on our visit. The atmosphere of these closets was foul, although the sewerage is good, being carried in drains to Fifteenth Street, and then pumped by the Shone system into the main sewer.

There is no fault to be found with the asylum in regard to its management. Its sanitary condition is susceptible of much improvement. The health of the children is good at present, and none sick of any infectious disease.

All of which is respectfully submitted.

W. R. CLUNESS,
GERRARD G. TYRRELL,
Committee.

SACRAMENTO, August 7, 1888.

REPORT OF COMMITTEE ON SAN DIEGO HOSPITAL AND ALMSHOUSE.

The committee appointed by the State Board of Health to examine into the sanitary condition and management of the San Diego County Hospital and Asylum, beg leave to report that at the date of visitation, September 11, 1888, the hospital contained forty-five patients; twelve receiving alms. We find the wards large, well ventilated, comfortably furnished, and clean. The bedsteads are iron, with wool mattresses. The food given to the patients is good in quality and quantity, but not well prepared, owing to a deficiency of help. The kitchen is small and not clean. The bathing facilities are sufficient, and each inmate gets a bath once a week. A detached building contains rooms for female patients. The dining room is small and not over clean. The privies are very dirty and need better attention.

The institution is well conducted, and no complaints were made except in regard to the cookery of the food, which can easily be remedied, but we must condemn the sanitary condition of the outhouses and the want of cleanliness in the kitchen and dining room. We stated these conclusions to the officers in charge, and they promised that this matter would at once receive their attention and be remedied.

The inmates appeared to be free from vermin, and had no complaint to make, upon private interviews with several.

H. S. ORME.
G. G. TYRRELL.

REPORT OF COMMITTEE ON SANTA CRUZ FEMALE ORPHAN ASYLUM.

The committee appointed by the State Board of Health to examine into the sanitary condition and administration of the Santa Cruz Orphan Asylum, beg leave to report that at the time of visitation the asylum contained, August 17, 1888, some fifty children, orphans and half orphans.

On the lower floor we found the rooms exceedingly neat, clean, and comfortably furnished. The dining room was quite well furnished with white tablecloths, napkins and rings, knives and forks, delph plates, cups, and saucers, and everything in the nicest order. The kitchen was very neat and scrupulously clean, pantry well supplied with provisions, the bread white, sweet, and well baked. The dietary was ample and varied daily.

In the dormitories we found the bedsteads iron, with straw mattresses overlaid by one of hair, the sheets scrupulously clean, a blanket and comforter, over which was a white counterpane, all in the best order. The floors were perfectly washed and clean; ventilation by windows and doors only.

The first dormitory is fifty-seven by twenty-five by ten, containing thirty-four beds for children between three and eleven years old, with a space for one Sister to superintend. The second dormitory, sixteen by twelve, contained eight beds, and one bed for supervising Sister. We also visited the small infirmary containing two beds, one curtained. The clothes room is a model of neatness, each child's garment having a separate locker and properly numbered.

The wash room was neatly matted, each child having a separate basin, towel, brush, comb, tooth and nail brush, and cake of soap. This was the neatest and most complete lavatory yet seen in any institution, and spoke volumes for the care the children received. The children are bathed regularly once a week in stationary washtubs, and are kept clean and neat. No vermin was found on the children or in the house. The house is devoid of water-closets, like all these old houses, but the privies were perfectly clean and in as good a condition as care could make them.

We were much pleased with this institution; as, after the most rigid examination, we could find nothing to condemn in the way of administration. The sanitation was excellent, with the means at hand. Ventilation was secured by windows, and carefully looked after by the Sisters, and with properly constructed water-closets would be in the best possible condition.

We believe the aid given by the State to this institution well bestowed and faithfully administered. When the new building now contemplated is erected, we believe that nothing further will be desired in making the asylum a perfect type of a well conducted institution.

W. R. CLUNESS.
G. G. TYRRELL.

REPORT OF COMMITTEE ON THE FEMALE ORPHAN ASYLUM, GRASS VALLEY.

The committee appointed by the State Board of Health to examine into the sanitary condition and administration of the Orphan Asylum of Grass Valley, beg leave to report that at the time of visitation, August 20, 1888, the Female Asylum contained two hundred orphans and half orphans; ninety-five children from one to twelve years of age occupied a building detached from the main building.

The dormitories were large, well ventilated, and gave a cubic air space of five hundred feet for each child. The bedsteads were iron, hair mattresses, sheets, blankets, counterpane, and pillows, all perfectly clean and sweet. We found all the rooms well kept, everything in the best of order. The clothes rooms, wash rooms, recreation rooms, and school rooms perfectly clean and neat. The kitchen is large and well appointed. The dining rooms ample and well supplied with service of delph, spoons, knives, forks, and cups.

The dietary is ample and of good quality. The children are well clad, healthy, and well fed, without any complaints of their treatment. We consider this institution well conducted, its sanitary arrangement capable of much improvement in regard to water-closets and drainage, but on the whole it will compare favorably with any other institution of the kind in the State. There is no sickness in the institution, and the perfect cleanliness that is observed keeps the inmates free from vermin.

W. R. CLUNESS.
G. G. TYRRELL.

REPORT OF COMMITTEE ON BOYS ORPHAN ASYLUM, GRASS VALLEY.

The institution contains seventy-five orphans and half orphans.

The dormitories are large; bedsteads of iron; ventilation by windows and doors; bedclothes clean, neat, and in sufficient quantity. The children are washed daily; have a bath once a week; are well clothed; in good health, and free from vermin. We find their dietary ample, of good quality, and well prepared. The lack of sufficient water renders the sanitary arrangements defective, but every care is taken to keep all offensive odors destroyed and the closets clean. We think the institution well conducted, and the appropriation honestly expended. Every place inspected gave evidence of great care in keeping everything clean and sweet, and the boys were loud in their praises of their teachers and guardians.

W. R. CLUNESS.
G. G. TYRRELL.

REPORT OF COMMITTEE ON HOME FOR FEEBLE-MINDED CHILDREN.

The committee appointed by the State Board of Health to report upon the sanitary condition and administration of the Home for Feeble-Minded Children at Santa Clara, beg leave to report that they visited the institution August 14, 1888, and learned that there was then one hundred children upon the roll-call. We were conducted round the premises by Dr. Osborne, the Superintendent. The main school room was clean and well ventilated. The closets were of the latrine pattern, flushed frequently and without odor; these, with the wash basins, were properly trapped and in good order.

The primary class room accommodates fifteen pupils, giving an average of nearly two hundred cubic air space for each scholar. The higher class room accommodates ten scholars, where music, history, geography, and ornamental work is taught by a salaried teacher. The dormitories were next visited; we found them neatly kept and perfectly clean. The beds were brass and supplied with straw and hair mattresses, blankets, sheets, counterpane, all perfectly clean and in sufficient quantity. The large dormitory contained seventeen beds, giving a cubic air space of five hundred feet for each boy.

The ventilation is by windows and doors, with closets and bath room off dormitory, all well trapped, clean, and without odor. The dormitory for small boys is forty by twenty-three by twelve, containing twenty-three children, giving an average air space of five hundred feet for each boy. The bedsteads are brass, well supplied with bedding, and everything neat, comfortable, and clean. The latrines or closets with wash rooms off the

dormitory, are properly trapped and ventilated and emit no odor. The play room is heated by an iron stove, properly guarded against accident. Physical correction of the children is not permitted in the institution. The dining room contains seven tables, well furnished with white table-cloths, glasses, knives, forks, spoons, saltcellars, and crockery ware. The kitchen is ample, clean, and neatly furnished. The store room is well provided with provisions and groceries.

Outside the main building is a preserving room where the larger girls are employed cutting up and canning fruit. The cook's pantry is well provided with flour; ten barrels a month being used. Two hundred loaves are baked each week. The bread is white, sweet, and well baked. Seven cows are kept by the institution, which supply an abundance of fresh milk.

In a separate building from the main one is the girls' department, consisting of a dormitory for small girls, containing twenty-two beds; this is well lighted and ventilated; also a small room containing three beds; in another room are nine beds for epileptic inmates. These are all supplied with wash, bath rooms, and water-closets—everything neat and clean.

The water supply is obtained from a well one hundred and four feet deep, pumped by steam into large tanks, some seventy feet high. The laundry is supplied with steam power, and all washing and ironing is done by machinery.

The sewage is carried away by large drains into a field and there emptied into a large covered cesspool, some five hundred feet from the house.

The institution is under the medical charge of Dr. Osborne, and the management of the children under the care of the doctor's wife, Mrs. Osborne. Under the care of these officers, we find the institution most excellently managed; its sanitary arrangements as perfect as possible to make them; the children as clean, tidy, and well cared for as assiduous attention can bestow; and believe that this institution will compare favorably with any asylum of like character in the United States. We have nothing but commendation to offer, and think the aid conferred by the State is administered honestly and economically.

GERRARD G. TYRRELL.
W. R. CLUNESS.

REPORT OF COMMITTEE ON FEMALE ORPHAN ASYLUM AT SAN JUAN.

The committee appointed by the State Board of Health to examine into the sanitary conditions and management of the Orphan Asylum of the Sacred Heart, at San Juan, San Benito County, beg leave to report, that at the time of visitation, August 18, 1888, there were in the institution seventy orphans and half orphans. The building is old and needs enlarging, but everything about it was neat and clean. The dormitory down stairs contains forty-seven beds for girls of all ages; it is fifty by thirty-two by twelve, giving a cubic air space for each child of four hundred feet. The ventilation is had through ventilators in walls and by windows. The bedsteads are iron with wire mattresses; straw bedding with sheets, blankets, counterpanes, and feather pillows; beds and clothing changed every week. A small dormitory containing two beds is on this floor for sick children; also a room for the occupancy of the Sisters. All beds, coverings, floors, etc., beautifully neat and clean. Up stairs is a dormitory ninety by thirty by ten, containing twenty-four beds, with same furniture as down stairs. Adjoining is a small room for Sisters.

The washing or bathing room contains twelve porcelain basins, with

lockers for brushes, combs, soap, tooth brushes, and towels. The children are washed face, hands, and feet every day, and a general bath once in two weeks.

The sanitary arrangements for removing excreta is by tin buckets, there being no water-closets in the house. The buckets are removed and emptied every morning. This should be obviated by the erection of properly constructed closets, as more conducive to that propriety and modesty so inherent in the female mind.

The laundry is in a detached building, and no fault can be found with its management. The bath rooms were old, but clean, and were supplied with both hot and cold water. Seven water-closets were in the yard, kept clean, without odor, and unobjectionable. The dining room was well furnished with delfh dinner service, knives, forks, glasses, and napkins, all scrupulously neat and clean. Water is supplied by a deep well and wind-mill.

No sickness was in the institution, all the children being in good health.

The school rooms were rather small for the number of children assembled. The pupils are, in addition to a good English education, taught embroidery and fancy work.

Examined the children and found them clean, comfortably clad, devoid of vermin, and emphatic in their declaration that they were well fed and cared for. Examined their dietary, and found it ample and of good quality. We are of the opinion that this institution deserves the support it receives from the State, and applies the money so received judiciously and well. No fault can be found with its administration, and its sanitary condition is as good as its means will allow.

W. R. CLUNESS.

G. G. TYRRELL.

REPORT OF COMMITTEE ON PAJARO MALE ORPHAN ASYLUM.

The committee appointed by the State Board of Health to examine into the sanitary condition and administration of the Pajaro Valley Orphan Asylum, beg leave to report that upon the occasion of our visit (August sixteenth) the institution contained one hundred and eighty-seven boys, from two to fourteen years old—orphans and half orphans—under the superintendence of Father Clementine. The study hall is quite a large hall, seventy-two feet long and twenty-eight feet wide, with a height of twelve feet; it was clean and well furnished for the use intended. The smaller recitation rooms were also clean and neat. Up stairs the dormitories are provided with wooden bedsteads, straw mattresses, sheets, blankets, and quilts; fairly clean. No vermin were discovered. The floors were swept every morning, and the bed linen changed once a week. The dormitories are under charge of a lay Brother who sleeps off the room. Ventilation is by windows.

The first dormitory contains twenty beds for large boys. The room is thirty by twenty-eight by twelve, giving a cubic air space of four hundred feet, which is nearly sufficient.

The second dormitory for smaller boys is also thirty by twenty-eight by twelve, and contains twenty-five beds (this is for medium sized boys) with same cubic air space. The teacher, Professor McDonough, sleeps in a room between these dormitories, and overlooks the rooms at night.

The third dormitory is seventy-two by twenty-eight by eleven, and contains beds for fifty boys. The fourth dormitory is the same size as the third, and likewise contains fifty beds for medium-sized boys. Ventilators

are placed in the walls near the roof in each of these dormitories, which, with the windows, give good ventilation. The upper dormitory is ventilated by an opening in the ceiling, and contains a less number of beds. The floors are all swept every morning.

There are no water-closets in the building, the night soil and urine being received in chambers in the rooms, which are emptied every morning. The lavatory, or wash room, is inadequate, but washes twenty boys at a time. The boys wash their faces and hands whenever they are dirty. Their bodies are washed once a week by hand, there being no bath rooms in the building; in the summer they are allowed to bathe in the lake at the rear of the building.

The privies are twelve in number, and empty into a latrine, which is filled with water and emptied once a week into a wooden sewer, which runs into the lake.

The water for the wash room is obtained by pipe and windmill from the lake. The laundry is adjoining, the washing being done by two Brothers of the Order, assisted by the larger boys, every Monday. The water for the laundry is also obtained from the lake. Comment is useless, for, although the lake is large, the water is more or less polluted.

The clothes room is in another building; the clothes are neatly folded in separate divisions and properly numbered. Adjoining this room is one where a tailor is employed to keep the clothes in order. Close by is the shoemaker's shop, where shoes are mended and the older boys taught the trade, if so desired.

A drug store is neatly fitted up and well stocked, under the supervision of a lay Brother.

There is no sickness in the asylum, and the children were all vaccinated, but not with that success which is absolutely necessary to insure safety.

The dining room is large and commodious, and furnished with tin cups, plates, and spoons. The kitchen is well furnished. There is a bakery attached, which uses a barrel of flour daily. The bread is white and brown, well baked, light, and nutritious. The butcher shop is in the yard, supplying thirty to forty pounds of meat daily. The butcher kills one steer and a pig monthly. The garden supplies all vegetables. Fruit is abundant and of good quality. The boys being assembled, we carefully examined them, found them well clad, clean, and without vermin. No corporal punishment is inflicted. The boys were interrogated and had no complaints to make; said they were well fed, slept warmly, and were well taken care of. We find the institution well managed, the sanitary arrangements being however deficient, tending to promote illness and to impair the general health of the boys. The food is ample, of good quality, and well cooked, and we believe the funds of the State are honestly applied for the purpose intended. If the bathing and removal of excrementitious matters were improved by proper sanitary arrangements, we believe no fault could be found with the asylum.

W. R. CLUNESS.
G. G. TYRRELL.

REPORT OF COMMITTEE ON HOME OF BENEVOLENCE, SAN JOSÉ.

The committee appointed by the State Board of Health to examine into the sanitary condition and administration of the Home of Benevolence, San José, beg leave to report that at the time of our visit, August fourteenth, the institution contained fifty-nine children, whose ages ranged from two to

thirteen years. The children's sitting room, for boys and girls, the dimension of which was thirty by forty feet, was comfortably furnished, and kept clean; ventilation by windows. One room was devoted to sewing, where children's clothes were made and mended; in this room were clothes presses and wash room. The children have each a full bath once a week.

In the basement beneath the house is the children's play room—earthen floor, basement unfinished, not in good sanitary condition, and too dirty for the purpose intended. The privies are in the yard, about one hundred feet from the house; male and female closets under same roof, divided by partition, both filthy and horribly offensive. The boys' playground is divided from the girls by a latticed fence.

Four cows are kept in stable in this yard, which supply milk and butter in part to the institution. The main building is heated in winter by furnace.

Examined the children, detected no vermin. The children were fairly clad, contented, and had no complaints to make. Passing into the house and upstairs, we examined the dormitory for middle-sized boys. It contained twenty beds. Bedsteads of iron, mattress straw, with blanket, sheet, and counterpane, all neat and clean; room carpeted down center with home-made rag carpet. Off this room is sleeping apartment for lady in charge of dormitory. Second dormitory contains eight beds for boys under ten years of age. Furniture same as other dormitory and equally clean. Third dormitory contains eight beds for larger boys, which did not differ from the others.

The wash room for boys is not large enough. There is but one bathtub in the house, and one old-fashioned pan water-closet, which is only used in case of necessity. The urine and other excrementitious matters are collected in cans, and removed each morning from the dormitories, an indecent and disgusting mode of procedure, but no other is available in the institution at present.

In the girls' department, the rooms are just like the boys'. The beds are clean, and sufficient clothing is provided. The floors are painted, and rag carpets occupy the center of each dormitory. The sanitary arrangements for night soil is on the same plan, and even more to be condemned than for the boys', as it tends to lessen that innate modesty peculiar to the female sex, and is destructive of all privacy.

Physical punishment is not applied to either sex, except in the mildest form.

The dietary is ample and of good quality. The bread sweet, white, well baked, and wholesome; meat is given daily.

The water is supplied by a well, and appears to be of good quality. We must, however, condemn unqualifiedly the sanitary condition of the out-houses and privies, and the mode of receiving the night soil in the institution. We also must condemn the absence of sufficient bathing facilities for both boys and girls, and recommend that a covered bath-house be erected, properly supplied with bathtubs and modern water-closets for the use of the inmates.

W. R. CLUNESS.
G. G. TYRRELL.

REPORT OF COMMITTEE ON INSANE ASYLUM, STOCKTON.

The undersigned, a committee chosen by the State Board of Health July 26, 1888, to make an examination into the sanitary condition of such

public institutions in Southern California as draw money from the State Treasury, have attended to the duty assigned to them, and would now respectfully report:

On July twenty-seventh we visited the State Insane Asylum at Stockton. We were very kindly received by the Superintendent, Dr. W. H. Mays, who offered us every facility for a thorough examination of the institution. While we find much to commend, there were some matters which we feel to be our duty to condemn, and of sufficiently vital importance to bring to official notice, and recommend immediate attention thereto.

The first and most important point to which we would call attention, is the crowded condition of the institution. Allowing the regular legal amount of cubic air space per capita, we find there is not quite room for one thousand two hundred persons to be accommodated, while the present number is near one thousand seven hundred. For that number of patients we think the medical attendance too small. With so few medical officers it is utterly impossible to render to each case such care and attention as their physical wants require, not mentioning that care that their unfortunate mental condition demands and in this enlightened age should receive. There should be not less than two more physicians, and they should reside on the premises. We were much surprised to find that the ventilating shafts from wards in lower stories of female department terminated in the attic story, in which now, on account of the crowded condition of the building, the Superintendent is obliged to place patients, thus subjecting them to an exposure to the vitiated air arising from the lower stories. We recommended immediate attention to carrying these air shafts through the roof. We found the south wall of female department in a very bad condition; the bricks of which being porous, and not covered by paint or cement, allow the rain and moisture to percolate through them, thus rendering the inner walls and ceiling damp, and capable of producing much discomfort as well as danger to the health of the patients.

We called the attention of the Directors to a few other matters strictly within their province, separate from legislative enactment, and they cheerfully remedied them.

The matter of the sewerage of the institution, which is in a very bad condition, is now receiving the earnest and active consideration it deserves.

The sum total of the condition of this institution is that the Directors are expected to accomplish too much with too little money. The legislative appropriations are too small for the successful management of a public charity of the magnitude of the Stockton Insane Asylum.

H. S. ORME.

C. A. RUGGLES.

REPORT OF COMMITTEE ON SAN JOAQUIN COUNTY HOSPITAL.

On July twenty-eighth we visited and critically examined the County Hospital of San Joaquin County. We find it to be a large, comfortable, and commodious wooden building, well adapted to hospital purposes. It is situated on the eastern border line of the City of Stockton. The supply of water is from the city waterworks and from deeply cased wells, is of excellent quality, and abundant in quantity. The building is well supplied with hydrants and hose, and well protected from fire. The drainage and sewerage is good. We found fifty-four persons receiving aid from the State Treasury. From personal examination and conversation, we found them

well cared for, well fed, well clad, and as happy and contented as could be expected under the circumstances. We found that the officer in charge had segregated those drawing State aid. We advised that the separation be discontinued, as it tended to cause a feeling of superiority over the strictly county inmates, which suggestion was immediately adopted.

H. S. ORME.
C. A. RUGGLES.

REPORT OF COMMITTEE ON COUNTY HOSPITAL, LOS ANGELES.

The County Hospital of Los Angeles County was next visited by us. Great courtesy and kindness were showed us by the Resident Physician and his assistant. The total number of patients was one hundred and forty-five, of which number twenty-five were receiving aid from the State. They were critically examined and closely questioned, and were found to be well clad, well fed, well cared for, and happy and contented. We cannot say that we were much pleased with the hospital building, as it is very poorly adapted to the purpose designed. It surely would not receive the indorsement of modern sanitary engineers. There are too many patients in a limited space; the wards are very much crowded, but that difficulty will soon be remedied, as we are assured by the Supervisors that as soon as the building now being erected at Downey is completed at least sixty persons will be removed thereto. The water supply is very limited—too small for successful flushing of hospital drains, and no protection against fire. The water-closets are unfortunately placed in the building, and, in consequence of the small supply of water for flushing purposes, are in a very unsanitary condition. The drains carry off, to an open cesspool in a distant ravine, the entire sewage of the institution, far enough away from the building as not to affect it, but near enough to surrounding property to be an intolerable nuisance, destructive to the personal enjoyment of property and dangerous to public health.

C. A. RUGGLES.
H. S. ORME.

REPORT OF COMMITTEE ON STATE NORMAL SCHOOL.

The State Normal School at Los Angeles was visited and thoroughly examined. At the last visit of a committee of this Board many valuable and important suggestions for change and improvement were made to the officers in charge. We find that all of those suggestions have been adopted. Great improvements have been made in ventilation and sewerage, and it affords us much pleasure to say that the institution is in an excellent condition.

C. A. RUGGLES.
H. S. ORME.

REPORT OF COMMITTEE ON LOS ANGELES ORPHAN ASYLUMS.

We next visited the Los Angeles Orphan Asylum (Catholic). It is to be much regretted that the management of this charity are compelled to continue in this ancient, antiquated building, so utterly and completely

unfit for an institution of that character and magnitude, many portions of the building unsafe as well as untenable. We learn with pleasure that the plans are drawn for a larger and better building, and it will soon be completed, in which very particular attention has been given to provide a thorough system of ventilation and all other sanitary improvements. We found one hundred and fifty-four inmates—thirty-three whole orphans, and one hundred and twenty-one half orphans. The building is ventilated by means of doors and windows. There are eight dormitories, averaging thirty-three feet by twenty-three feet and ten feet high, with an average of twenty-one beds in each ward, occupied by twenty-one children; a Sister always sleeps in the same room with the children. The institution has been peculiarly favored during the year as to sickness. Only five cases of measles, with no deaths, have occurred. The water supply is from the city waterworks, is ample and of good quality. The water-closets, as is all the household sewage, are discharged into public sewers by pipes which are properly trapped. We made a careful personal inspection of the children and found them cleanly, well fed, well clothed, and happy.

On August third, we visited the Los Angeles Protestant Orphan Asylum. The present number of inmates is eighty-one—fifty-eight boys and twenty-three girls. There are six whole orphans and seventy-five halforphans. The building is old, and for an institution of this size and character it is highly unfit, having outlived its usefulness. The new building now being erected will soon be ready for occupancy, and will have all the modern improvements of a sanitary nature. The present building is ventilated by doors, transoms, and windows. The wards or dormitories are too crowded. No matron or attendant sleeps in same room with the children. We advised a change in that respect, as accidents and sudden sickness are liable to take place in the night, when the assistance of an attendant would be very necessary. The water is supplied by the city waterworks; it is very good and abundant. The children are cleanly, well clad and well fed, and to all appearances happy and contented. From our examination of this institution we would draw these conclusions: *First*—Too much crowded condition of building. *Second*—An unsanitary condition of water-closets and their surroundings. All of which we believe will be remedied on occupation of the new building.

C. A. RUGGLES.
H. S. ORME.

REPORT OF COMMITTEE ON ST. VINCENT'S ORPHAN ASYLUM, SANTA BARBARA.

We then visited the St. Vincent's Female Orphan Asylum, at Santa Barbara. We were very kindly received by the Sisters in charge, who afforded us every facility for a complete and thorough examination of the institution. We were conducted through all the dormitories, school rooms, dining rooms, and cooking rooms. The children were drawn up in line for personal inspection, the authorities courting the most critical examination possible. It is conducted by the Roman Catholic denomination. The present number of inmates is fifty-five—twenty-six whole orphans and twenty-nine half orphans. The building is well ventilated by doors and windows. There are two dormitories, each seventy-five feet by thirty feet, and sixteen feet high. In one dormitory there are twenty-five beds, and thirty in the other. Two Sisters sleep in each ward to render any assistance to the little ones at night. The water supply is from the city waterworks, is good, and

amply sufficient. The water-closets are separate from the building, discharging into cesspools, which are often emptied and disinfected. The children are well clad and well fed. A personal examination of food showed it to be of the best quality, and the larder well supplied with all the necessities, and many luxuries, of life. We would express ourselves as well satisfied with the condition and management of this institution.

C. A. RUGGLES.

H. S. ORME.

REPORT OF COMMITTEE ON MERCED COUNTY HOSPITAL.

The County Hospital of Merced County was next visited. The institution is situated about one mile south of the town of Merced, near the line of the Southern Pacific Railroad. The buildings are old and illy adapted to hospital purposes. We regretted the absence of Dr. Rucker, the physician in charge, but were shown every attention by the Steward. We found that there were seventeen patients drawing State aid. A personal examination showed them to be in a happy, contented condition, well clad, and well fed. The building is well ventilated. The water supply is good and abundant. The sewage is conducted in pipes to a large cesspool fifty yards from the building.

CHAS. A. RUGGLES, M.D.

HENRY S. ORME, M.D.

REPORTS ON INDIGENT SICK IN COUNTY HOSPITALS.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Mono County Hospital for the year ending June 16, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease	Total by each Disease	DISEASES.	No. Deaths by each Disease
5	Rheumatism	0	1	Chronic syphilis	0
1	Typho-malarial fever	0	1	Hypertrophy of heart	1
1	Cystitis	0	3	Wound	0
1	Paralysis	0			

Number of months reported	12	Discharged	3
Total on hand at commencement of year ..	2	Died	1
Total admitted	11	Percentage of deaths	7.5
Discharged cured	7	Remaining under treatment	2

Name and location of hospital: MONO COUNTY HOSPITAL, Bodie, California, eight thousand three hundred and fifty feet above sea-level.

Physician's name and Post Office address: D. WALKER, M.D., Bodie, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Merced County Hospital for the year ending May 31, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease	Total by each Disease	DISEASES.	No. Deaths by each Disease
4	Rheumatism		1	Laryngitis	
9	Intermittent and bilious fever ..	1	2	Suppressed secretion	
9	Accidental injuries		2	Ulcer of leg	
3	Lumbago		4	Measles	
2	Asthma		1	Dyspepsia	
8	Dysentery	1	1	Spinal disease	
3	Alcoholism	1	1	Pleurisy	
1	Cancer	1	1	Hemorrhage of bladder	
3	Typhoid fever	1	2	Locomotor ataxia	
3	Bronchitis		1	Sunstroke	
4	Phthisis pulmonalis		1	Tonsillitis	
2	Tuberculosis mesenterica	2	1	Syphilis	
4	Pneumonia	1	1	Paralysis	
2	Erysipelas		1	Heart disease	
1	Inguinal hernia	1	22	Indigent	

Number of months reported	12	Discharged	79
Total on hand at commencement of year ..	19	Died	9
Total admitted	90	Remaining under treatment	21
Discharged cured	63		

There are three of us that have the hospital here, and as we attend it month about, I cannot vouch for this being critically correct. The condition and location are fair. Sewage runs into a cesspool, covered. Ventilation is very good in the large new ward, but the

balance of the structure, which is old, and was moved to the present site, consists of small rooms, and the ventilation is faulty. This old part has been used about fifteen years; was moved and refitted about four years ago. The cases of intermittent fever are brought from a distance, there being no case within eighteen miles of this town at present. The twenty-two cases marked "indigent" are old, broken-down men, who are out of funds, not able to earn a living, with nothing special the matter with them. Women are seldom admitted. The Supervisors generally allow a monthly stipend (\$15) to their friends to care for them outside, although we now and then have one. One case of locomotor ataxia has been bed-ridden for about seven years. The cases of phthisis remained awhile, and asked permission to leave, as they frequently do.

Name and location of hospital : MERCED COUNTY HOSPITAL, Merced County, California.
Physician's name and Post Office address : H. N. RUCKER, Merced, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Fresno County Hospital for the year ending June 30, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
3	Diarrhœa	1	2	Heart disease .....	..
4	Dysentery .....	..	9	Paralysis .....	..
2	Smallpox (at the pesthouse) .....	..	3	Convulsions .....	..
5	Measles .....	..	14	Rheumatism .....	..
2	Diphtheria	2	2	Burns	1
2	Erysipelas .....	..	1	Blind .....	..
2	Typhoid fever	1	10	Injuries, external .....	..
29	Remittent and intermittent fever .....	..	7	Simple fractures .....	..
5	Chronic alcoholism	3	5	Compound fractures .....	..
13	Phthisis pulmonalis	4	10	Tertian syphilis .....	..
11	Pneumonia	2	2	Carbuncle .....	..
4	Pleurisy .....	..	3	Granulated eyelid .....	..
9	Bronchitis	2	1	Gunshot wound .....	..
1	Asthma .....	..	1	Cystitis .....	..
16	Disease of stomach and bowels	2	1	Snake bite .....	..
2	Disease of the liver .....	..	2	Necrosis .....	..
3	Bright's disease and nephritis	2			

Number of months reported	12	Discharged	10
Total on hand at commencement of year	33	Died	18
Total admitted	186	Percentage of deaths	9%
Discharged cured	127	Remaining under treatment	31

In October next we shall be in our new hospital building which is now being erected, and will cost \$25,000, and is being built on the plan of the Sacramento County Hospital. It is located about two miles east of Fresno, on high ground, and fine facilities for drainage. Street railroad running within one hundred yards of it. It consists of eighty acres, purchased by the county about two years ago at a cost of \$120 per acre, and can now be sold for \$500 per acre. I established the Fresno County Hospital in 1871, and have had the entire control and management of it since. I furnish everything, and manage it as I do my family; make and present my bill monthly, which is always paid.

Name and location of hospital : FRESNO COUNTY HOSPITAL, Fresno, California.
Physician's name and Post Office address : LEWIS LEACH, Fresno, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Plumas County Hospital for the six months ending June 30, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
1	Paralysis		1	Frostbite	
9	Chronic rheumatism	1	1	Eczema	
2	Old age		1	Syphilis	
1	Pelvic abscess		1	Valvular disease of the heart	1
1	Varicose veins		1	Neuralgia	

Number of months reported	6	Discharged cured	6
Total on hand at commencement of year ..	10	Died	1
Total admitted	19	Remaining under treatment	12

The Plumas County Hospital is situated one mile from Quincy, and is in a pleasant, sunny place. The building was built for the purpose; it is one hundred feet long by twenty-six feet wide, with an L forty-two by twenty feet, and is well built and furnished. Sewerage and ventilation good. Supplies everything that is needed. Medical attendance as often as needed, or at least twice a week. Each patient has a room eleven feet by nine and one half feet, and eleven feet high. Water supplies are good—plenty of cool spring water.

Name and location of hospital: PLUMAS COUNTY HOSPITAL, Quincy, California.

Physician's name and Post Office address: L. F. CATE, Quincy, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Lassen County Hospital for the month ending June 30, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
1	Endocarditis		1	Compound fracture of tibia and fibula, followed by secondary amputation	
1	Tertian syphilis				

Number of months reported	1	Remaining under treatment	3
Total admitted	1		

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the San Luis Obispo County Hospital for the half year ending June 30, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
1	Fever, intermittent		1	Conjunctivitis	
1	Variola	1	1	Sycosis menti	
1	Rubeola		2	Alcoholism	
7	Rheumatism		1	Curvature of spine	
1	Nephritis		1	Dislocation of spine	
1	Hæmatemesis		1	Fracture of femur	
1	Diarrhoea		1	Incised wound	
3	Phthisis	3	1	Ulcer of leg	
2	Syphilis		1	Paralysis	
1	Peritonitis	1	6	Contused wounds	
3	Bronchitis				

Number of months reported	6	Discharged cured	38
Total on hand at commencement of year ..	18	Died	5
Total admitted	38	Remaining under treatment	13

Name and location of hospital: SAN LUIS OBISPO COUNTY HOSPITAL, San Luis Obispo, Cal.
Physician's name and Post Office address: W. W. HAYS, San Luis Obispo, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Contra Costa Hospital for the three months ending July 31, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
2	Eczema		1	Paralysis	
1	Gastritis	1	1	Tumor	
1	Fracture of skull	1	4	Bronchitis	
4	Rheumatism		2	Pneumonia	1
1	Fracture of leg		1	Cancer of the stomach	1
1	Fracture of toe (amputation)		1	Rupture of bowels	1

Number of months reported	3	Discharged	5
Total on hand at commencement of year ..	23	Died	5
Total admitted	23	Remaining under treatment	17
Discharged cured	17		

Name and location of hospital: CONTRA COSTA COUNTY HOSPITAL, Martinez, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Los Angeles County Hospital for the six months ending August 31, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease	Total by each Disease	DISEASES.	No. Deaths by each Disease
5	Aneurism aorta.....	1	3	Jaundice.....	—
5	Abscess.....	—	2	Masturbation.....	—
7	Anchylosis.....	—	1	Nasal catarrh.....	—
2	Amputation.....	—	3	Neurasthenia.....	—
1	Apoplexy.....	1	3	Neuralgia.....	—
10	Asthma.....	—	4	Necrosis.....	—
1	Ascetis.....	1	2	Oorchitis.....	—
12	Bubo.....	—	1	Opium poisoning.....	—
8	Bronchitis.....	—	2	Ophthalmia.....	—
7	Bright's disease.....	3	1	Pleuro-pneumonia.....	1
4	Burns.....	—	46	Phthisis.....	29
5	Cancer.....	1	9	Pneumonia.....	3
1	Conjunctivitis.....	—	9	Pleurisy.....	—
1	Cerebro-spinal meningitis.....	1	5	Pregnancy.....	—
2	Concussion of brain.....	—	14	Paralysis.....	3
2	Carbuncle.....	—	1	Paralysis optic nerve.....	—
1	Congestion of brain, acute.....	1	2	Psoas abscess.....	2
1	Cataract.....	—	3	Prostatitis.....	—
2	Coxitis.....	—	3	Rubeola.....	—
1	Chorea.....	1	2	Railroad accident.....	1
11	Dysentery.....	—	50	Rheumatism.....	—
14	Delirium tremens.....	2	42	Syphilis.....	—
6	Dislocations.....	—	11	Sprains.....	—
3	Diarrhœa, chronic.....	—	5	Skin disease.....	—
3	Dyspepsia.....	—	5	Stricture urethra.....	—
3	Epilepsy.....	—	5	Septicæmia.....	2
3	Erysipelas.....	—	2	Starvation.....	—
4	Fistula in ano.....	—	1	Syphilitic hepatitis.....	1
7	Fractures.....	—	1	Sciatica.....	—
3	Furuncle.....	—	1	Sunstroke.....	—
38	General debility.....	3	1	Tuberculosis of testicle.....	—
5	Gonorrhœa.....	—	1	Typhoid pneumonia.....	1
2	Hernia, strangulated inguinal.....	—	18	Typhoid fever.....	5
2	Hydrocele.....	—	2	Uterine disease.....	—
4	Hemorrhoids.....	—	1	Variola.....	—
5	Heart disease.....	1	8	Varicose veins.....	—
15	Intermittent fever.....	—	5	Wounds, contused.....	—
7	Insanity.....	—	7	Wounds, incised.....	—
1	Internal injuries, fall.....	1	1	Wounds, lacerated.....	—
4	Influenza.....	—	4	Wounds, gunshot.....	1

Number of months reported.....	6	Discharged improved.....	56
Total on hand at commencement of year.....	162	Died.....	65
Total admitted.....	489	Remaining under treatment.....	133
Discharged cured.....	400		

Los Angeles County Hospital and Farm is situated in Los Angeles County, about one mile east of the city, on a farm of thirty-seven acres of rolling ground; is high and dry, with a fine view of the city and surrounding country. The hospital is surrounded by a fine orchard of orange, lemon, apple, peach, fig, and other fruit trees. The front is nicely laid out in flowers, and each side of the entrance road is bordered with cypress hedges, as is the front on both sides of the entrance. Along the sides and back are numerous pepper trees, for shade. The hospital is a large fine building of wood, two stories high, each twelve feet in clear, hard finished throughout, is set up about five feet from the ground, with wide porches around the front of building, and a wide porch above and below in the rear; containing seven large wards in the main building and two sunny wards in the rear, which are used for consumptive patients; each with nine or ten beds, each lighted with nine large windows. Both wards stand up ten feet above the ground; under one is the laundry fitted up with stationary tubs and hot and cold water. The seven large wards in the main building have room for ten or twelve beds in each. Two of the wards on the south each have five large windows; the two on the east and west front each have four windows. The main hallway is twelve feet wide; cross halls between the wards are ten feet wide. There are water-closets and bath rooms on each floor. The front is occupied as office, dis-

pensary, and storeroom, on one side of the hall; the other is occupied as reception room and library. The second floor has three of the large wards and four smaller rooms that are occupied by the steward, matron, and nurses. In the rear of the main building, between the two wards in the rear, is the dining room, seating at present fifty-four; under the dining room is the kitchen, fitted up with range and hot-water tank, also storeroom and dining room for employes. The house is supplied with water from the city water works. The sewerage is good, having a fall of about fifty feet, to a ravine with running water in, in the rear of the farm. Supplies are bought in Los Angeles as needed. Dr. Barton Dozier is medical attendant—visits every day. The house was built in 1878, and is now in good condition. The area to each patient I do not know.

Name and location of hospital: LOS ANGELES COUNTY HOSPITAL, Los Angeles, California.
Physician's name and Post Office address: BARTON DOZIER, Los Angeles, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Kern County Hospital for the year ending May 31, 1888.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
20	Malarial	1	9	Secondary syphilis	—
6	Malarial fever	—	6	Paralysis	1
4	Consumption	2	18	Rheumatism	—
7	Pneumonia	2	2	Diabetes	—
2	Bronchitis	—	1	Fracture of leg	—
5	Dysentery	2	1	Fracture of arm	—
2	Measles	—	4	Asthma	1
2	Typhoid fever	—	20	Biliousness	—
1	Typhoid pneumonia	—	12	General debility	1
1	Erysipelas	—	1	Overitis	—
7	Alcoholism	1			
Number of months reported					
		12	Discharged		129
Total on hand at commencement of year		13	Died		11
Total admitted		131	Percentage of deaths		12
Discharged cured		112	Remaining under treatment		16

The Kern County Hospital is situated one third of a mile southwest of the town of Bakersfield, and consists of a frame building. Two wards, twenty by thirty feet, each containing eight beds; also three single rooms, twelve by fourteen feet—two of them containing two beds each, and the other one bed—office and dispensary, hall, kitchen, dining room, and bath room, with a ten feet wide porch on the north and east side of the building. There is also a block of land, appropriated for recreation grounds and the raising of fruit and vegetables. The hospital receives its supply of water from the Bakersfield water works. The system of sewerage is ample for the accommodation of the institution. Dr. L. S. Rogers is the attending physician. The steward regulates the furnishing of supplies and medicines, there being no contract system. The Board of Supervisors pays all bills.

Name and location of hospital: KERN COUNTY HOSPITAL, Bakersfield, Kern County, Cal.
Physician's name and Post Office address: L. S. ROGERS, Bakersfield, California.

FINANCIAL STATEMENT.

STATEMENT

Of the Expenses of the State Board of Health for Thirty-eighth Fiscal Year, ending June 30, 1887.

1886.		
Appropriation.....		\$1,250 00
July	1—Post Office rent.....	\$2 00
	3—Traveling expenses of Dr. Briceland.....	35 00
	Traveling expenses of Dr. H. S. Orme.....	50 00
	Traveling expenses of Professor Rising.....	10 00
	Postage stamps, Dr. Orme.....	10 00
	12—Postal cards.....	12 00
	28—Expressage.....	65
	Rent of office.....	25 00
Aug.	30—Stamps.....	10 00
	Telegrams.....	1 25
	Office rent.....	25 00
Sept.	1—Post Office rent.....	2 00
	Expressage and telegrams.....	2 50
	Rubber stamps for office.....	4 50
	28—Postage stamps.....	10 00
	30—Office rent.....	25 00
Oct.	5—Telegraph and expressage.....	2 75
	10—Blank cards, \$1; Sanitary News, \$2.....	3 00
	Sanitary Engineer.....	4 00
	19—Traveling expenses of Dr. H. S. Orme.....	50 00
	Expenses to Toronto. American Public Health Association.....	100 00
	Traveling expenses of Dr. H. C. Crowder.....	8 00
	Traveling expenses of Dr. J. M. Briceland.....	25 00
	Traveling expenses of Dr. Jas. Simpson.....	12 00
	20—Conference Board of Health.....	5 00
	Annals Hygiene.....	2 00
	Stamps for biennial report.....	45 00
	Expressage.....	2 40
	Office rent.....	25 00
Nov.	1—Postage stamps.....	10 00
	6—American Public Health Association, vol.....	5 00
	Expressage.....	1 05
	30—Postage stamps.....	20 00
	Office rent.....	25 00
Dec.	9—Postal cards.....	5 00
	11—Stamps.....	5 00
	31—Office rent.....	25 00

FINANCIAL STATEMENT—Continued.

1887.			
Jan.	3—Post Office rent	\$2 00	
	5—Expressage and telegraphing	4 15	
	13—Traveling expenses of Dr. Orme	50 00	
	Traveling expenses of Dr. Briceland	25 00	
	27—Postage stamps	15 00	
	Office rent	25 00	
Feb.	5—Sanitarian	4 00	
	Stamps	5 00	
	20—Telegraphing	2 40	
	26—Traveling expenses	10 00	
	28—Telegrams	2 00	
	Expressage	2 95	
	Office rent	25 00	
Mar.	1—Telegrams and expressage	31 70	
	30—Stamps	10 00	
	Post Office rent	2 00	
	Rent of office	25 00	
April	10—Traveling expenses of Dr. H. C. Crowder	8 00	
	Traveling expenses of Dr. Briceland	20 00	
	Traveling expenses of Dr. H. S. Orme	70 50	
	Traveling expenses of Dr. G. G. Tyrrell	20 00	
	Telegraphing	6 00	
	Stamps	5 00	
	Dunscombe & Co.	3 60	
	Office rent	25 00	
May	10—Postal cards	10 00	
	20—Stamps	10 00	
	Telegraphing	1 05	
	Office rent	25 00	
June	22—Traveling expenses of Secretary	17 50	
	29—Hotel expenses, eight days	40 50	
	Stamps	10 00	
	Postal cards	5 00	
	Office rent	25 00	
	E. W. Maslin, legal services	100 00	
	Total	\$1,249 65	
	Balance	35	
	Total	\$1,250 00	\$1,250 00

STATEMENT

Of the Expenses of the State Board of Health for Thirty-ninth Fiscal Year, ending June 30, 1888.

1887.			
Appropriation.....			\$1,250 00
July	1—Post Office rent.....	\$2 00	
	15—Traveling expenses of Dr. H. S. Orme.....	50 00	
	Traveling expenses of Dr. H. C. Crowder.....	10 00	
	Traveling expenses of Dr. J. M. Briceland.....	25 00	
	Telegraphing.....	1 55	
	Office rent.....	25 00	
	23—Annals Hygiene.....	2 00	
Aug.	8—Stamps.....	10 00	
	Telegraphing.....	1 50	
	31—Office rent.....	25 00	
Sept.	8—Stamps.....	10 00	
	23—Traveling and hotel expenses.....	10 00	
	30—Stamps.....	5 00	
	Telegraphing, monthly bill.....	3 85	
	Postal cards.....	5 00	
	Post Office rent.....	2 00	
	Office rent.....	25 00	
Oct.	14—Expressage Sanitary News.....	2 75	
	Conference State Board of Health.....	5 00	
	18—Sanitary Record.....	2 50	
	Telegraphing bill.....	5 30	
	Traveling expenses of Dr. H. S. Orme.....	60 00	
	Traveling expenses of Dr. H. C. Crowder.....	10 10	
	Traveling expenses of Dr. J. M. Briceland.....	23 50	
	Traveling expenses of Dr. Jas. Simpson.....	14 00	
	Traveling expenses of Dr. R. B. Cole.....	13 00	
	Office rent.....	25 00	
Nov.	7—Stamps and postal cards.....	10 00	
	Official seal.....	10 00	
	8—Telegraphing.....	89	
	30—Stamps.....	15 00	
	31—Office rent.....	25 00	
Dec.	13—Traveling expenses, Truckee, etc.....	16 20	
	Post Office rent.....	2 00	
	Telegraph bill.....	6 97	
	Office rent.....	25 00	

FINANCIAL STATEMENT—Continued.

1888.			
Jan.	12—Stamps	\$10 00-	
	Traveling expenses of Dr. Briceland	25 50	
	Traveling expenses of Dr. C. A. Ruggles	8 40	
	Traveling expenses of Dr. H. C. Crowder	13 50	
	Traveling expenses of Dr. R. B. Cole	15 00	
	Traveling expenses of Dr. H. S. Orme	50 00	
	15—American Public Health Association	5 00	
	25—Postage stamps	20 00	
	27—Postal cards	20 00	
	31—Office rent	25 00	
Feb.	3—Express charges on smallpox circulars	19 15	
	Postal wrappers	4 20	
	Sanitarian	4 00	
	Express charges on Conference State Boards of Health	4 80	
	12—Stamps	10 00	
	Two hundred reports of National Conference	7 00	
	Office rent	25 00	
Mar.	12—Vaccination Vindicated	2 00	
	13—Traveling expenses to San Francisco	10 00	
	12—Expenses to Calaveras County	27 70	
	Expressage on circulars	4 08	
	Stamps	5 00	
	Post Office box	2 00	
	30—Expenses to Watsonville and return	13 50	
	Office rent	25 00	
April	17—Traveling expenses of Dr. H. S. Orme	70 65	
	Traveling expenses of Dr. Briceland	31 30	
	Traveling expenses of Dr. C. A. Ruggles	20 40	
	Traveling expenses of Dr. G. G. Tyrrell	27 00	
	30—Stamps	10 00	
	Telegraphy	4 13	
	Office rent	25 00	
May	20—Stamps	10 00	
	Telegraph and express charges	2 21	
	Office rent	25 00	
June	12—Expenses to San Francisco	11 00	
	20—Expenses to San Francisco and return	8 50	
	25—Postage stamps	10 00	
	Telegraph	65	
	Post Office rent	2 00	
	31—Office rent	25 00	
Total		\$1,123 78	
Balance		128 24	
Total		\$1,250 00	\$1,250 00

*Expenses of State Board of Health on Account of Contagious and Infectious Diseases for
Thirty-eighth and Thirty-ninth Fiscal Years, 1887-8.*

1887.		
Appropriation		\$10,000 00
Mar. 12—Traveling expenses of the State Board to Los Angeles, San Diego, etc.	\$432 00	
Salary of Dr. H. J. Borde, Quarantine Officer, Tulare	44 35	
Salary of Dr. M. J. Rowley, Quarantine Officer, Mojave	56 45	
Salary of Dr. James J. Choate, Quarantine Officer, Colton	57 10	
Salary of Dr. C. B. Brierly, Quarantine Officer, Barstow	57 10	
Salary of Dr. W. A. Weldon, Quarantine Officer, San Pedro	25 00	
Salary of Dr. J. H. Magee, Quarantine Officer, San Diego	8 25	
30—Vaccine virus for Inspectors	30 20	
April 30—Salary one month, Dr. H. J. Borde	125 00	
Salary one month, Dr. M. J. Rowley	125 00	
Salary one month, Dr. J. J. Choate	125 00	
Salary one month, Dr. C. B. Brierly	125 00	
Salary one month, Dr. W. A. Weldon	50 00	
Salary one month, Dr. T. H. Magee	25 00	
Telegraphing to officers, etc.	7 74	
1888.		
Jan. 1—Telegraphy	9 52	
Feb. 1—Salary of Dr. S. P. B. Knox, Inspector, Santa Barbara	50 00	
Salary of Dr. Taggart, Inspector, Tulare	63 30	
Jan. 7 to 14—Salary of Dr. Wyman, Inspector, Tulare	20 00	
Vaccine virus to January 31	111 00	
Salary of Dr. T. A. Davis, San Diego	13 35	
Salary of Dr. W. A. Weldon, San Pedro	60 00	
Telegraphy, Dr. Orme, Los Angeles	4 70	
Vaccine to Dr. Davis	6 00	
Feb. 1—Telegraphy bill	5 83	
Kirk, Geary & Co., vaccine	27 60	
Salary of Dr. Taggart, Tulare	100 00	
Salary of Dr. W. A. Weldon, San Pedro	100 00	
Salary of Dr. T. A. Davis, San Diego	100 00	
Salary of Dr. S. P. B. Knox, Santa Barbara	100 00	
Mar. 1—Telegraph bill	4 46	
Vaccine virus	17 00	
Traveling expenses of Dr. Orme	43 00	
May 1—Traveling expenses of Dr. Orme to Conference of Boards of Health	377 15	
Total	\$2,506 10	
Balance	7,493 90	
Total	\$10,000 00	\$10,000 00

NAMES AND RESIDENCES OF CORRESPONDENTS

Of the State Board of Health for the years 1887 and 1888.

DR. J. E. S. BAKER.....	Angels Camp, Calaveras County.
DR. S. C. GIBSON.....	Anderson, Shasta County.
DR. R. F. ROONEY.....	Auburn, Placer County.
DR. SAMUEL MCCURDY.....	Azusa, Los Angeles County.
DR. J. T. McLANE.....	Alameda, Alameda County.
DR. T. H. MAYON*.....	Amador City, Amador County.
DR. ALBERT FOUCH.....	Anderson, Shasta County.
DR. J. H. BULLARD.....	Anaheim, Los Angeles County.
DR. J. M. VANCE*.....	America, Santa Clara County.
DR. J. M. FORREST.....	Alturas, Modoc County.
DR. C. A. ROGERS.....	Bakersfield, Kern County.
DR. EDWARD GRAY.....	Benicia, Solano County.
DR. F. H. PAYNE.....	Berkeley, Alameda County.
DRS. O. C. HAWKINS and W. R. CLEVELAND.....	Biggs, Butte County.
DR. DAVID WALKER.....	Bodie, Mono County.
DR. A. H. RHEA.....	Calico, San Bernardino County.
DRS. C. C. MASON and W. KING.....	Chico, Butte County.
DR. M. F. PRICE.....	Colton, San Bernardino County.
DR. C. H. GIBBONS.....	College City, Colusa County.
DR. J. O. SMITH.....	Cottonwood, Shasta County.
DR. J. PARKER.....	Castroville, Monterey County.
DRS. W. A. PATTERSON and B. WOODBRIDGE.....	Cedarville, Modoc County.
DR. R. S. MARKELL.....	Cloverdale, Sonoma County.
DR. A. M. GARDNER.....	Calistoga, Napa County.
DR. H. N. MINOR.....	Colfax, Placer County.
DR. E. J. R. DE TURBEVILLE*.....	Camptonville, Yuba County.
DR. A. TRAFTON.....	Dixon, Solano County.
DR. ALEMBY JUMP.....	Downieville, Sierra County.
DR. W. A. BROWN.....	Downie, Los Angeles County.
DRS. A. C. COLLINS and W. E. BATES.....	Davisville, Yolo County.
DR. E. W. BATHURST.....	Etna Mills, Siskiyou County.
DR. J. A. MCKEE.....	Elk Grove, Sacramento County.
DR. H. R. BULSON.....	Eureka, Humboldt County.
DR. T. S. ELLIS.....	Elsinore, San Diego County.
DR. PAUL REUDY.....	Forest Hill, Placer County.
DR. G. M. KOBER, U. S. A.....	Fort Bidwell, Modoc County.
DR. F. DURANT.....	Folsom, Sacramento County.
DRS. A. J. PEDLAR and LEWIS LEACH.....	Fresno, Fresno County.
DR. M. M. ROWLEY.....	Fall River, Shasta County.
DR. T. V. GOODSPEED.....	Galt, Sacramento County.
DR. W. C. JONES.....	Grass Valley, Nevada County.
DR. C. A. E. HERTEL.....	Gonzales, Monterey County.
DR. J. R. TODD.....	Gridley, Butte County.
DR. J. G. COOPER.....	Haywards, Alameda County.
DR. H. V. ARMISTEAD.....	Hills Ferry, Stanislaus County.
DR. J. A. DAVIDSON.....	Hanford, Tulare County.
DR. N. B. COFFMAN.....	Healdsburg, Sonoma County.
DR. E. G. CAMPBELL.....	Hollister, San Benito County.
DR. H. G. PIKE.....	Hopland, Lake County.
DR. H. SCHAFFER.....	Igo, Shasta County.
DR. A. L. ADAMS.....	Ione, Amador County.
DR. J. N. M. MCGOWAN.....	Jolon, Monterey County.
DR. E. B. ROBERTSON.....	Jackson, Amador County.
DR. J. H. LOWE.....	Knights Ferry, Stanislaus County.
DR. W. S. TAYLOR.....	Livermore, Alameda County.
DRS. M. HAGAN and J. M. REESE.....	Los Angeles, Los Angeles County.
DR. J. FLINT.....	Lincoln, Placer County.
DRS. D. W. WHITE and L. CARPENTER.....	Lakeport, Lake County.
DR. L. M. LOVELACE.....	Lemoore, Tulare County.
DR. F. W. COLMAN.....	Lodi, San Joaquin County.

DR. F. W. KNOWLES.....	Los Gatos, Santa Clara County.
DR. E. N. FOOTE.....	Lockeford, San Joaquin County.
DR. W. A. CRAIG.....	Lower Lake, Lake County.
DR. DAVID POWELL.....	Marysville, Yuba County.
DR. E. S. O'BRIEN.....	Merced, Merced County.
DR. E. V. JACOBS.....	Meridian, Sutter County.
DR. T. J. STEWART.....	Monrovia, Los Angeles County.
DR. J. N. CRABB.....	Millville, Shasta County.
DR. C. W. EVANS.....	Modesto, Stanislaus County.
DR. F. R. BROWN.....	Madera, Fresno County.
DR. W. J. KEARNEY.....	Mariposa, Mariposa County.
DR. W. E. ROBE.....	Maxwell, Colusa County.
DRS. A. WESTFALL and J. HOOD.....	Monterey, Monterey County.
DR. M. B. POND.....	Napa, Napa County.
DRS. H. S. WELCH and C. D. BOBO.....	Nevada City, Nevada County.
DR. M. SCHNABEL.....	Newcastle, Placer County.
DR. F. H. HUTCHINS.....	North Bloomfield, Nevada County.
DRS. Z. T. MAGILL and F. M. STRATTON.....	Nicolaus, Sutter County.
DRS. E. W. BUCK and D. D. CROWLEY.....	Oakland, Alameda County.
DR. J. H. M. KARSNER.....	Oroville, Butte County.
DR. E. CHAFFEY.....	Ontario, San Bernardino County.
DR. L. H. PATTY.....	Petaluma, Sonoma County.
DR. W. L. McALLISTER.....	Pasadena, Los Angeles County.
DR. J. Q. WRENN.....	Placerville, El Dorado County.
DRS. A. C. SMITH and W. A. NORMAN.....	Plymouth, Amador County.
DRS. R. T. BURR and DE WITT CRANK.....	Pomona, Los Angeles County.
DR. G. T. MASON.....	Redwood City, San Mateo County.
DR. H. E. STAFFORD.....	Rocklin, Placer County.
DR. JOHN FIFE.....	Red Bluff, Tehama County.
DRS. J. ALLEN and C. C. SHERMAN.....	Riverside, San Bernardino County.
DR. JACKMAN.....	Roseville, Placer County.
DR. H. L. NICHOLS.....	Sacramento, Sacramento County.
DRS. J. L. MEARES* and D. E. BARGER.....	San Francisco, San Francisco County.
DRS. T. L. MAGEE and D. GOCHENAUER.....	San Diego, San Diego County.
DR. R. F. WINCHESTER.....	Santa Barbara, Santa Barbara County.
DR. E. H. GOULD.....	Sonora, Tuolumne County.
DR. W. A. WELDON.....	San Pedro, Los Angeles County.
DR. C. L. ANDERSON.....	Santa Cruz, Santa Cruz County.
DRS. W. S. THORNE and F. K. SAXE.....	San José, Santa Clara County.
DR. R. P. SMITH, JR.....	Santa Rosa, Sonoma County.
DR. D. H. KETCHAM*.....	Santa Maria, Santa Barbara County.
DR. J. R. TULLY.....	Sierra City, Sierra County.
DR. W. J. G. DAWSON.....	St. Helena, Napa County.
DR. G. W. SEIFERT.....	Santa Clara, Santa Clara County.
DR. J. M. BRICKLAND.....	Shasta, Shasta County.
DR. T. R. GOODSPEED.....	San Mateo, San Mateo County.
DR. A. MILLIKEN.....	Susanville, Lassen County.
DR. H. J. CRUMPTON.....	Saucelito, Marin County.
DR. J. M. LACY.....	Santa Ana, Santa Barbara County.
DR. E. E. BROWN.....	Selma, Fresno County.
DR. MAY GYDISON.....	Salinas City, Monterey County.
DR. A. C. COLLINS.....	San Bernardino, San Bernardino County.
DR. W. W. HAYES.....	San Luis Obispo, San Luis Obispo County.
DR. A. T. HUDSON.....	Stockton, San Joaquin County.
DR. W. CURLESS.....	Truckee, Nevada County.
DR. PERRY.....	Tehachapi, Kern County.
DR. A. C. WINN.....	Tomales, Marin County.
DR. J. L. HOWELL.....	Tulare, Tulare County.
DR. H. P. TARTAR.....	Tehama, Tehama County.
DR. R. G. REYNOLDS.....	Upper Lake, Lake County.
DR. W. A. KING.....	Ukiah, Mendocino County.
DR. W. F. LYNCH.....	Volcano, Amador County.
DR. W. D. ANDERSON.....	Vallejo, Solano County.
DR. T. W. PENDERGRASS.....	Visalia, Tulare County.
DR. A. J. COMSTOCK.....	Ventura, Ventura County.
DR. J. C. MONTAGUE.....	Weaverville, Trinity County.
DR. W. D. RODGERS.....	Watsonville, Santa Cruz County.
DR. THOS. ROSS.....	Woodland, Yolo County.
DR. A. W. KIMBALL.....	Williams, Colusa County.
DR. L. MELTON.....	Wheatland, Yuba County.
DR. D. N. MASON.....	Willits, Mendocino County.
DR. C. L. GREGORY.....	Yreka, Siskiyou County.

* Deceased.

REPORT OF DEATHS

From June 30, 1886, to June 30, 1887, of those Dying in the State of California.

CAUSES OF DEATH.	SEXES.			AGES.								NATIVITIES.					
	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—ZYMOTIC OR EPIDEMIC.																	
Cholera	9		1														
Cholera morbus	216	92	32	136	37	3		1		2	1	4	1	207	4	4	1
Cholera infantum	118	50	29	46	23	1		4	8	6	4	11	39	72	16	17	13
Dysentery and Diarrhoea	18	10	5	2	3	2	2	4	1	1		1	3	3	9	3	3
Smallpox	34	18	3	9	17	1	1	1			1		4	28	2	2	2
Measles	60	28	6	5	31	8	8	2					6	54	2	2	2
Scarlatina	376	170	188	15	164	124	44	10	1	4		1	13	317	25	15	19
Diphtheria	164	79	72	13	100	33	7						11	153	4	2	5
Croup	64	31	23	10	36	21	1						6	62	1	0	1
Whooping cough	26	16	8	2	6	2	2	2	4	2	3	4		11	6	5	4
Erysipelas	21	9	2			1	2	6	3	2	3			11	6	3	1
Fevers—Typho-malarial	289	152	105	4	14	24	56	64	31	25	15	24	32	97	70	81	41
Typhoid	43	23	16	4	3	1	4	5	6	2	7	4	4	16	16	8	3
Remittent and Intermittent	92	43	35	29	19	8	6	4	5	3	3	4	11	65	11	9	7
Cerebro-spinal	26	14	12	10				9		2	3	1		9	4	10	3
Syphilis																	
Alcoholism (direct or remote), including delirium tremens	112	76	22					6	12	24	28	18	24	6	35	56	15
II.—CONSTITUTIONAL DISEASES.																	
Hydrocephalus	62	30	5	25	24	2		1	3				5	43	9	4	6
Meningitis	221	115	81	25	60	14	12	9	9	8	8	3	23	169	22	21	9
Phthisis pulmonalis	1,617	940	487	9	12	5	116	446	294	258	155	102	218	309	497	604	207
Marasmus	353	167	152	34	20	3	2	11	14	13	12	32	36	189	40	60	64
Scrofula	10	4		1	3		2	2	1				1	5	1	3	1
Rheumatism	33	16	15				1	5	2	2	9	14			7	19	2

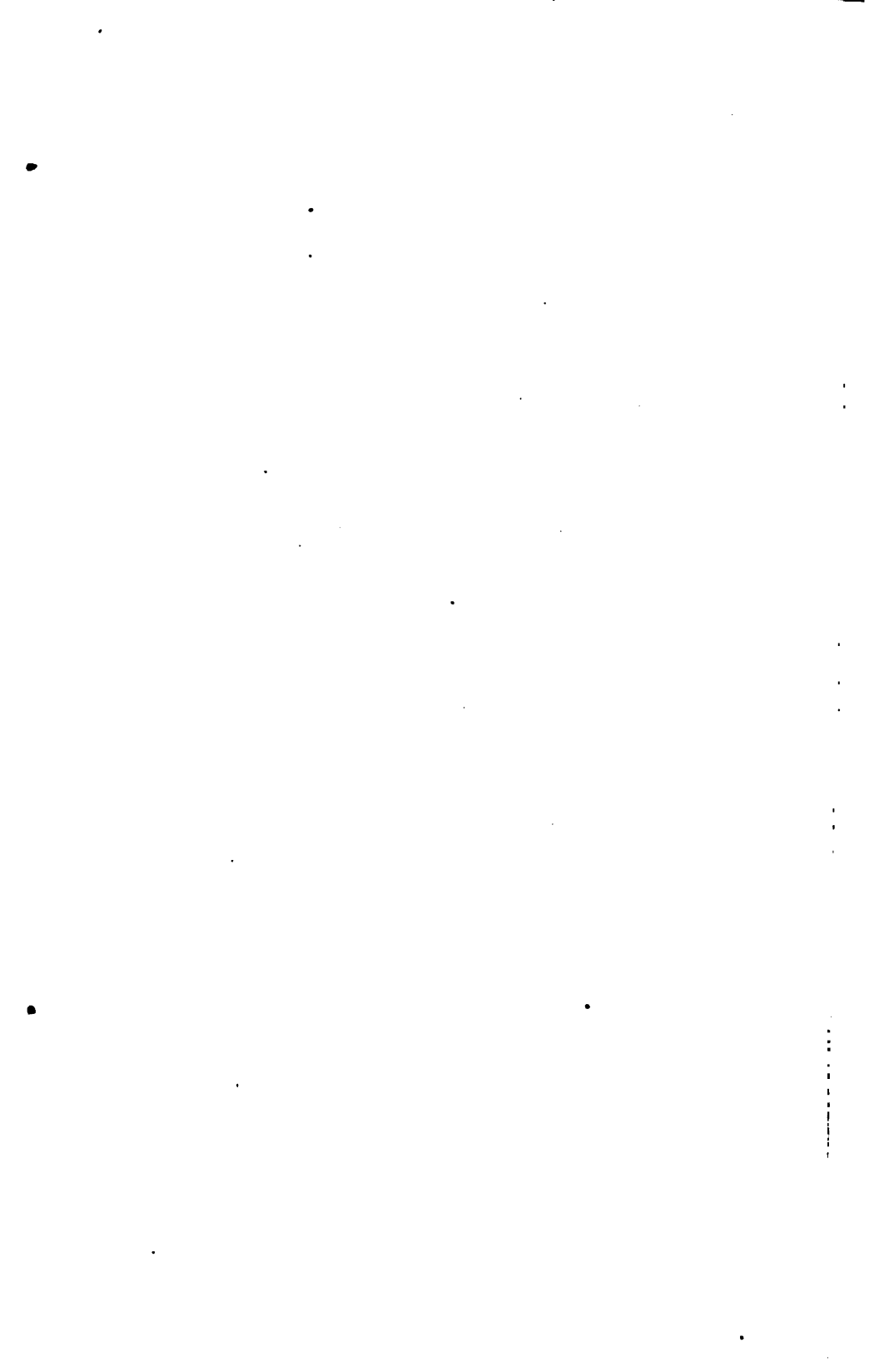
Cancer	300	119	154	27	2	1	3	15	24	71	64	84	86	21	78	167	34
III.—LOCAL DISEASES.																	
Pneumonia	611	338	216	57	69	59	10	18	52	70	72	65	97	99	128	214	78
Pleurisy	21	14	7	14	57	32	10	3	4	2	7	4	4	---	6	15	---
Bronchitis	183	87	85	10	24	10	5	1	6	7	10	12	30	19	21	59	16
Other diseases of respiratory organs	124	70	44	10	24	10	5	1	12	15	15	13	15	14	28	39	14
Enteritis	162	89	66	7	87	18	3	5	8	10	7	8	7	9	16	31	9
Gastritis	74	27	41	6	17	6	---	1	4	6	7	14	14	6	10	29	8
Gastro-enteritis	7	5	1	1	3	2	---	---	---	---	---	---	---	1	6	1	---
Peritonitis (non-puerperal)	115	46	62	7	10	6	2	9	23	17	23	10	8	7	36	43	9
Diseases of the liver	125	70	50	5	10	1	---	2	11	7	22	36	33	3	27	72	7
Other diseases of stomach and bowels	63	27	25	11	6	4	2	2	7	2	8	4	19	9	16	22	6
Bright's disease and nephritis	163	96	57	12	3	2	3	9	19	17	35	32	31	14	23	37	23
Aneurism	39	24	8	7	---	1	---	---	3	1	14	8	6	7	1	20	7
Heart diseases	546	307	204	55	9	5	10	20	51	47	93	100	159	72	61	253	83
Convulsions	195	108	77	10	133	45	2	2	3	---	1	---	1	7	185	5	3
Other diseases of brain and nervous system	190	107	64	19	19	15	3	9	10	12	30	29	43	20	48	69	25
IV.—DEVELOPMENTAL DISEASES.																	
Puerperal diseases	33	---	33	---	---	---	---	1	15	9	3	---	1	4	9	12	6
Old age	193	78	98	17	---	---	---	---	---	---	---	---	183	---	53	99	40
V.—EXTERNAL CAUSES.																	
Suicide	122	99	15	8	---	---	---	2	12	30	31	21	8	7	23	66	26
Heat, death from—sunstroke	2	2	---	---	---	---	---	1	---	---	1	---	---	---	---	2	---
All other causes not classified	2,702	1,660	768	274	303	105	44	83	216	289	332	258	412	650	469	1,098	480
Stillbirths	357	196	138	23	---	---	---	---	---	---	---	---	---	357	---	---	---
Totals	10,316	5,667	3,641	1,008	1,369	885	327	439	1,065	970	1,138	930	1,387	3,729	1,975	3,326	1,286

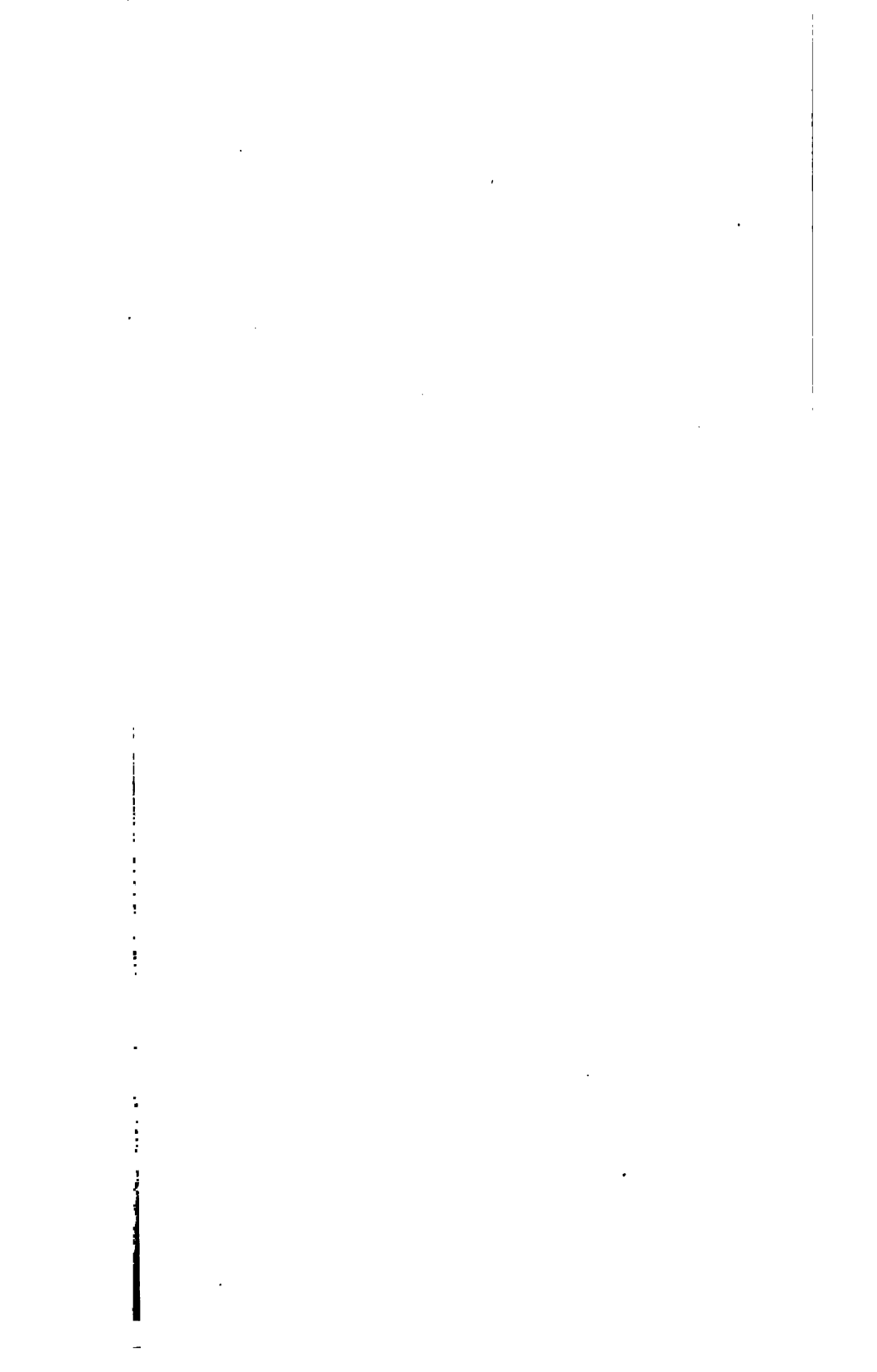
REPORT OF DEATHS

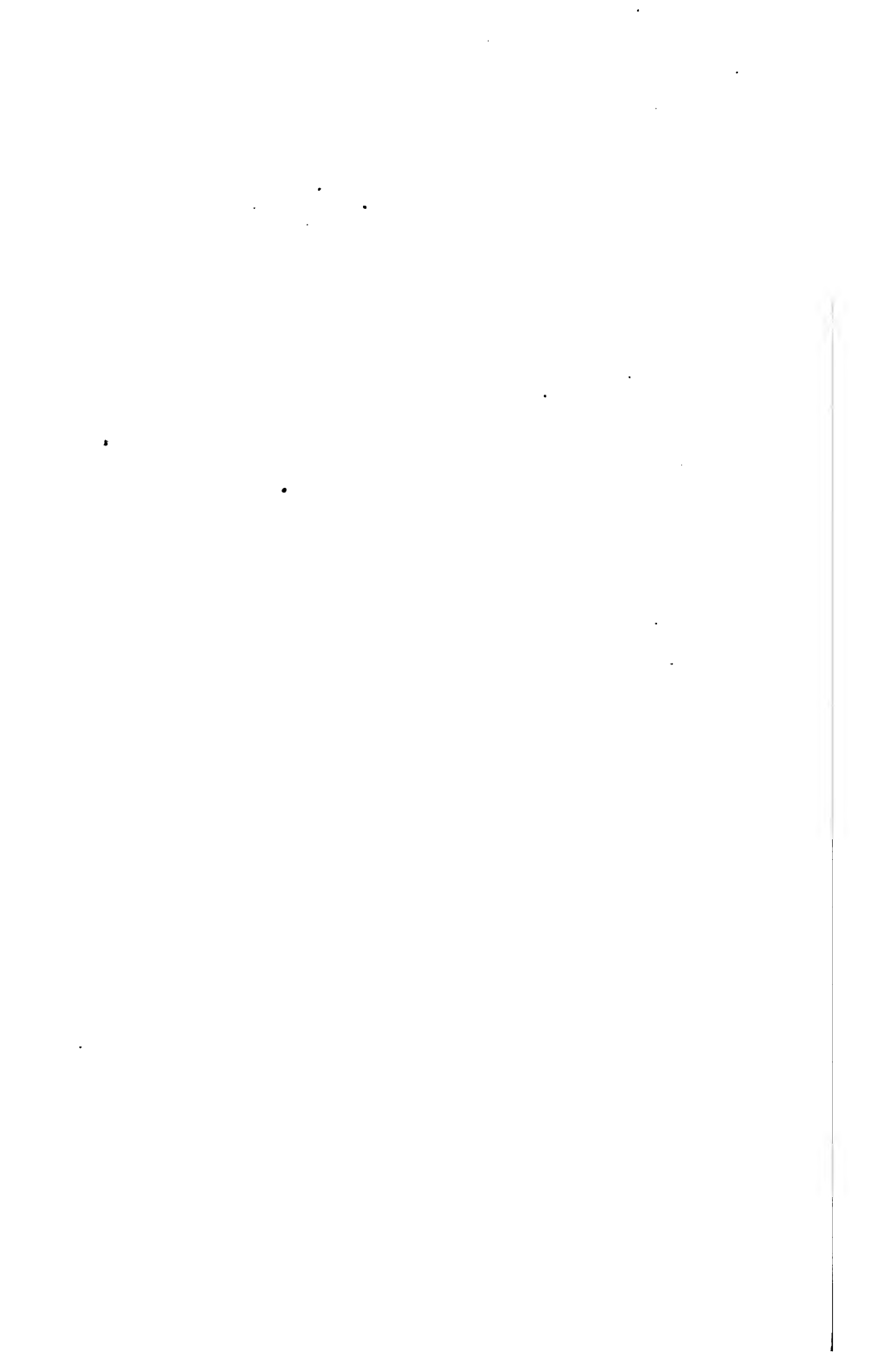
From June 30, 1887, to June 30, 1888, of those Dying in the State of California.

CAUSE OF DEATH.	SEXES.			AGES.								NATIVITIES.					
	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—ZYMOTIC OR EPIDEMIC.																	
Cholera	27	16	1	3	2	2	2			5	1	12	2	12	3	12	1
Cholera morbus	253	135	99	17	32	1	1						7	237	8	5	6
Cholera infantum	132	75	48	9	24	5	1	7	5	10	6	23	10	71	25	30	9
Diarrhoea and Dysentery	94	66	27	1	6	5	3	26	16	7	13	5	4	20	31	34	9
Smallpox	139	59	68	14	38	69	11	4	4			1	8	114	20	4	1
Measles	59	28	25	6	16	24	8	2					4	40	11	3	5
Scarlatina	358	174	163	21	14	172	93	5	2	1			36	283	49	15	11
Diphtheria	203	106	85	12	24	115	9	5	1	2			5	182	13	1	7
Croup	4	3	1	3	20	1							1	42			
Influenza	42	22	18	2	20	1	2	6	6	3	2	8	3	16	13	9	3
Whooping cough	41	26	13	2	10	1	2	7	5	2		3	1	17	9	2	1
Erysipelas	29	12	13	4	6	1	2	6	5				3	1	9		
Fever—Typho-malarial	414	242	166	16	40	37	94	115	42	30	10	14	31	165	109	110	30
Typhoid	80	43	34	3	12	6	8	13	9	8	5	13	3	29	26	20	5
Remittent and Intermittent	144	68	67	9	47	38	17	14	4	3		3	5	107	15	13	9
Cerebro-spinal	28	14	14	14				4	3	3			4	18	1	9	
Syphilis																	
Alcoholism (direct or remote), including delirium tremens	148	113	26	9		1		10	26	32	41	21	17	23	41	73	11
II.—CONSTITUTIONAL DISEASES.																	
Hydrocephalus	24	12	10	2	6	1	1							23		1	
Meningitis	289	158	121	10	79	115	20	11	12	8	8	6	7	214	40	26	9
Phthisis pulmonalis	1,832	1,138	592	8	28	8	112	506	411	299	152	126	182	355	583	782	112
Marasmus	333	203	128	2	16	4	3	34	6	9	5	26	1	238	33	34	28
Scrofula	9	4	4	2	4		1	1	1				1	7		1	1
Rheumatism	22	15	7	1		2	2	2	3	5	1	6		2	8	12	

Cancer	317	151	160	6	.....	.....	.....	11	25	79	77	107	18	24	108	107	18
III.—LOCAL DISEASES.																	
Pneumonia	1,039	625	373	41	125	175	49	56	98	88	127	113	153	391	234	381	33
Pleurisy	26	15	9	2	1	3	1	1	2	6	2	2	7	9	6	10	1
Bronchitis	262	131	121	10	80	65	5	8	6	11	20	21	36	132	42	81	7
Other diseases of respiratory organs	138	85	48	5	39	15	.....	7	9	7	17	19	19	59	29	41	9
Enteritis	217	113	104	.....	124	23	9	6	5	14	8	6	17	156	18	41	3
Gastritis	86	37	46	3	19	11	1	3	5	3	11	10	19	.....	32	31	3
Gastro-enteritis	33	18	15	.....	11	4	.....	3	2	4	1	1	6	1	5	8	4
Peritonitis (non-puerperal)	124	56	68	.....	4	4	6	14	25	22	13	12	20	4	34	56	3
Diseases of the liver	190	142	45	3	3	4	2	4	18	24	48	45	41	1	16	103	11
Other diseases of stomach and bowels	84	53	27	4	23	5	3	3	4	10	4	16	14	2	32	18	2
Bright's disease and nephritis	221	145	71	5	3	5	2	9	30	24	51	44	51	27	67	115	12
Aneurism	33	30	3	.....	.....	.....	.....	.....	7	7	14	7	5	.....	11	21	1
Heart diseases	694	423	234	37	16	9	10	34	59	74	113	119	202	101	194	369	30
Convulsions	237	137	99	1	152	66	7	1	1	2	2	1	3	2	215	16	6
Other diseases of brain and nervous system	243	142	90	11	31	27	9	3	13	21	40	27	65	63	79	81	20
IV.—DEVELOPMENTAL DISEASES.																	
Puerperal diseases	43	.....	43	.....	.....	.....	.....	8	21	7	4	1	1	15	13	10	5
Old age	186	98	85	8	.....	.....	.....	.....	.....	.....	.....	.....	186	20	64	81	21
V.—EXTERNAL CAUSES.																	
Suicide	186	116	18	2	.....	.....	.....	9	36	31	20	13	16	18	43	68	7
Heat, death from—sunstroke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
All other causes not classified	2,990	1,896	925	159	335	121	53	108	293	273	418	257	550	856	812	1,078	234
Stillbirths	329	57	39	233	.....	.....	.....	.....	.....	.....	.....	.....	.....	326	.....	.....	3
Totals	12,322	8,197	3,350	773	1,750	1,257	439	606	1,405	1,209	1,419	1,035	1,785	4,760	2,905	3,973	682

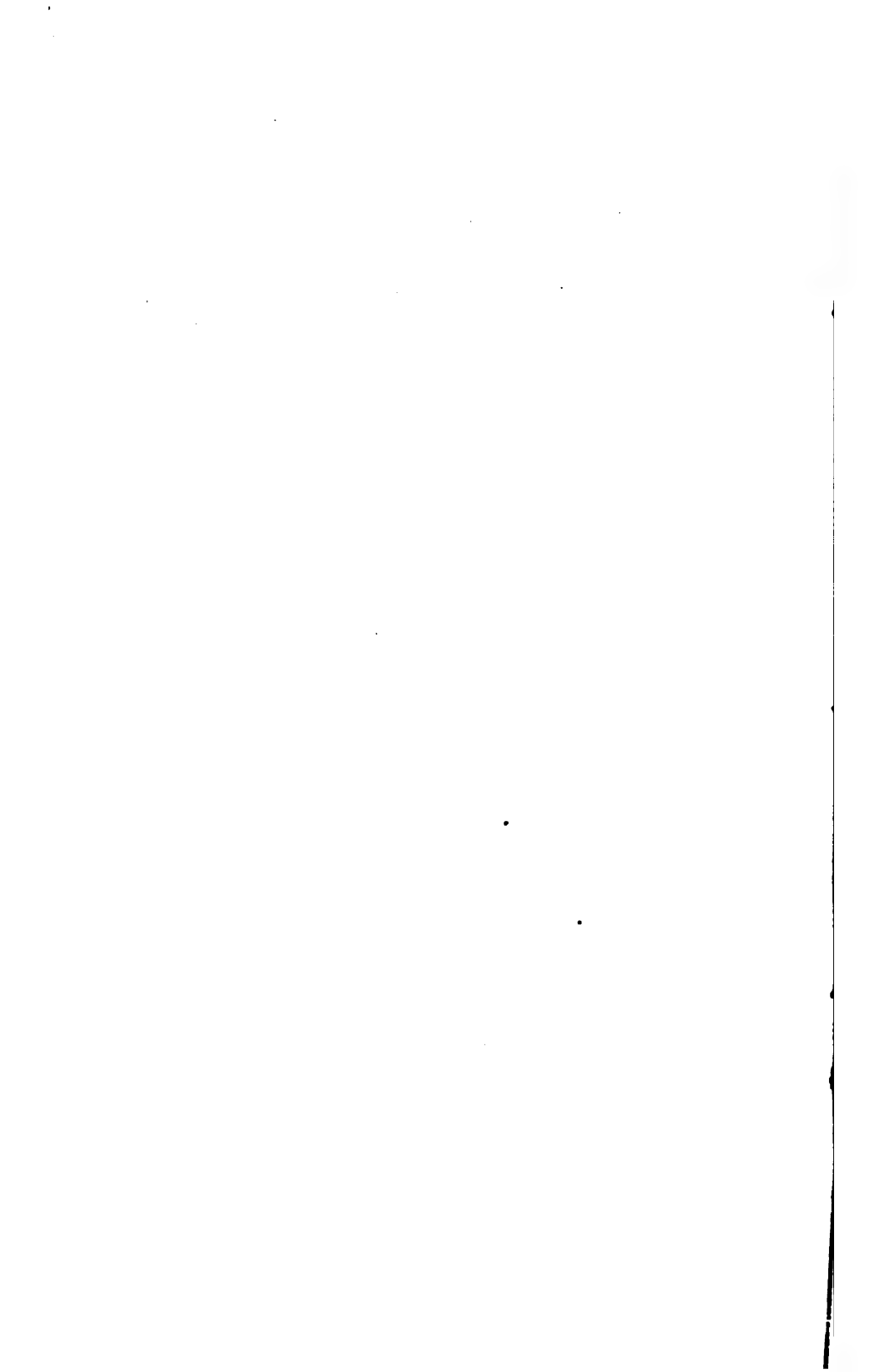


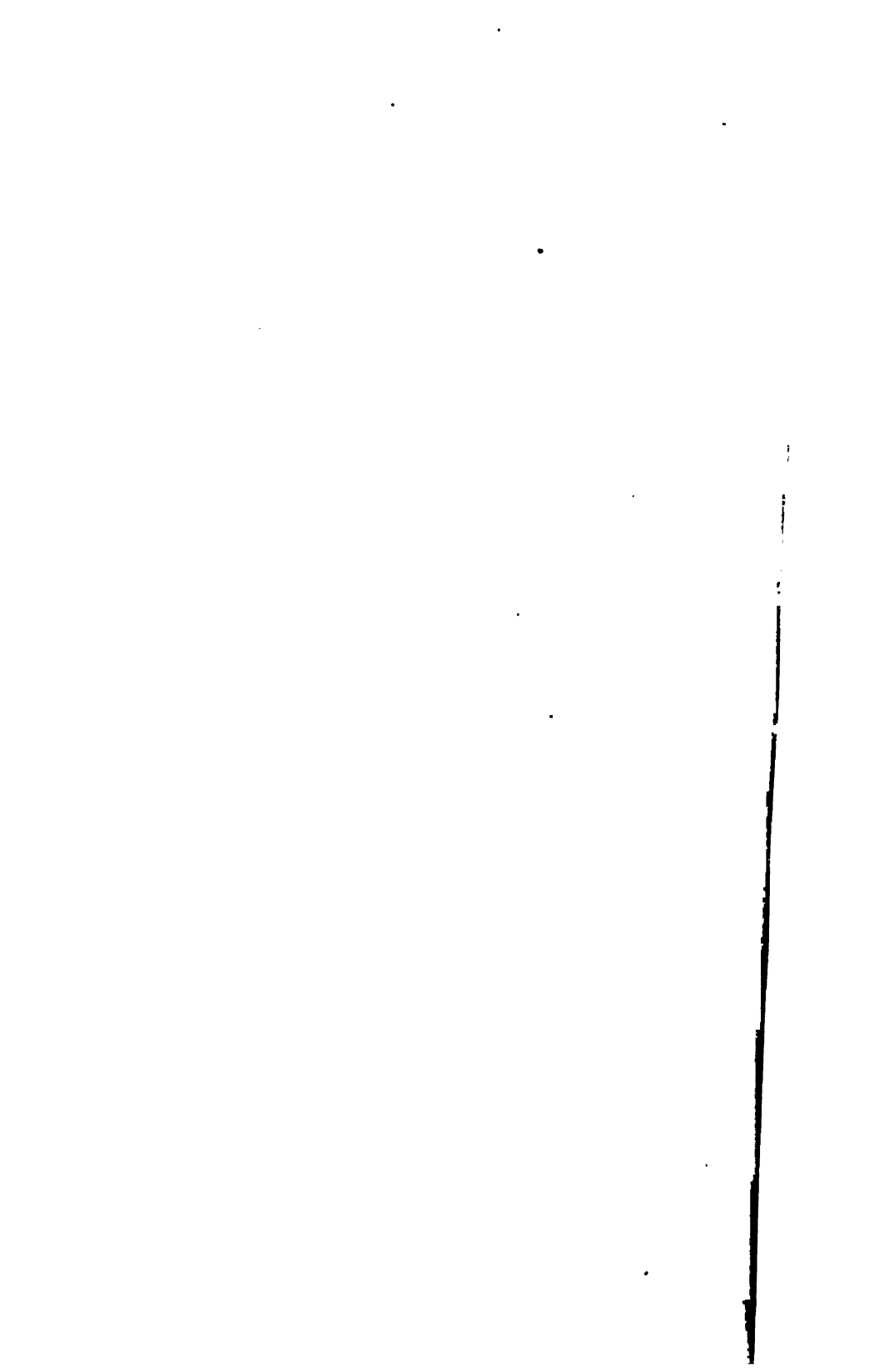


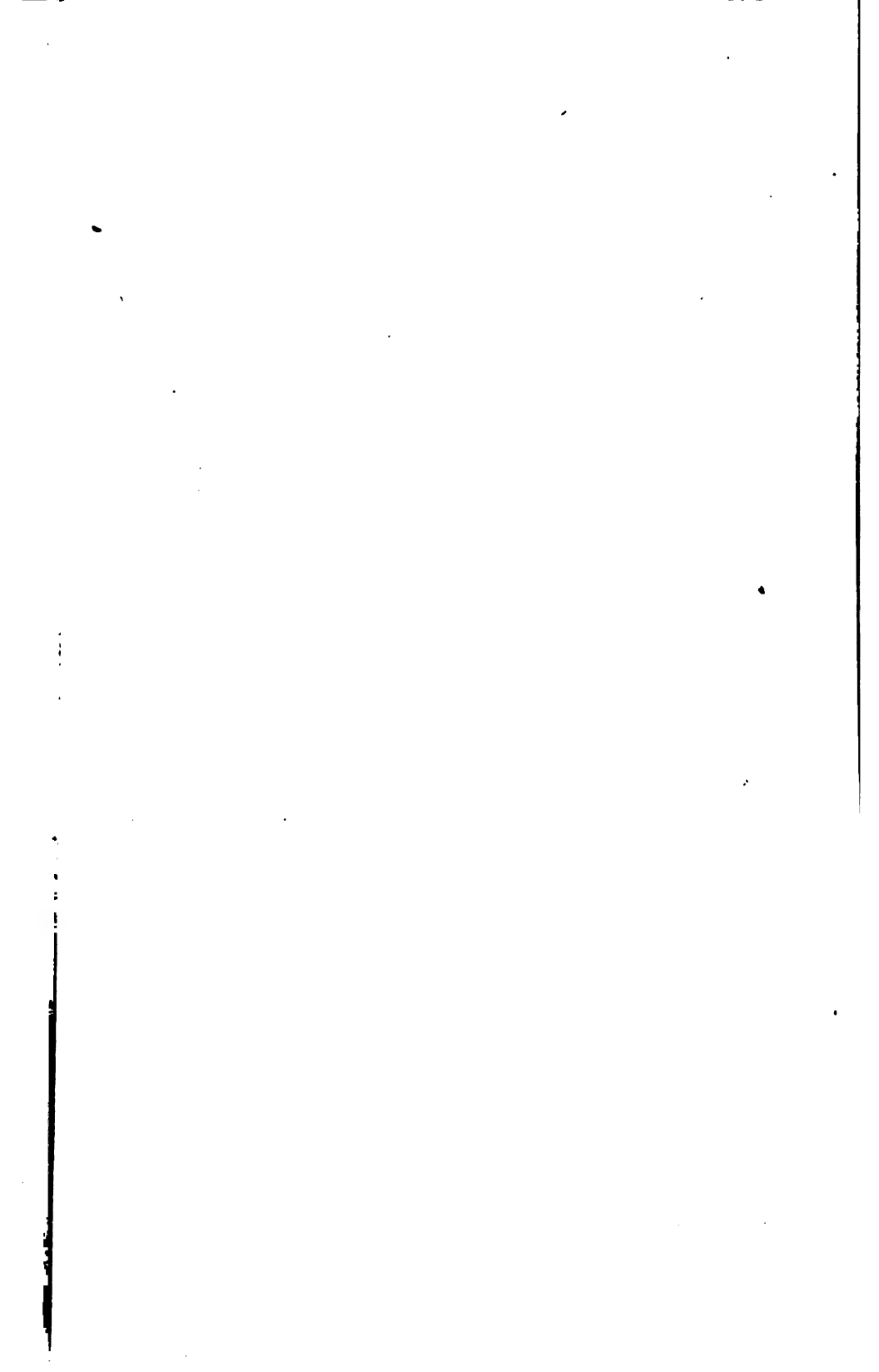


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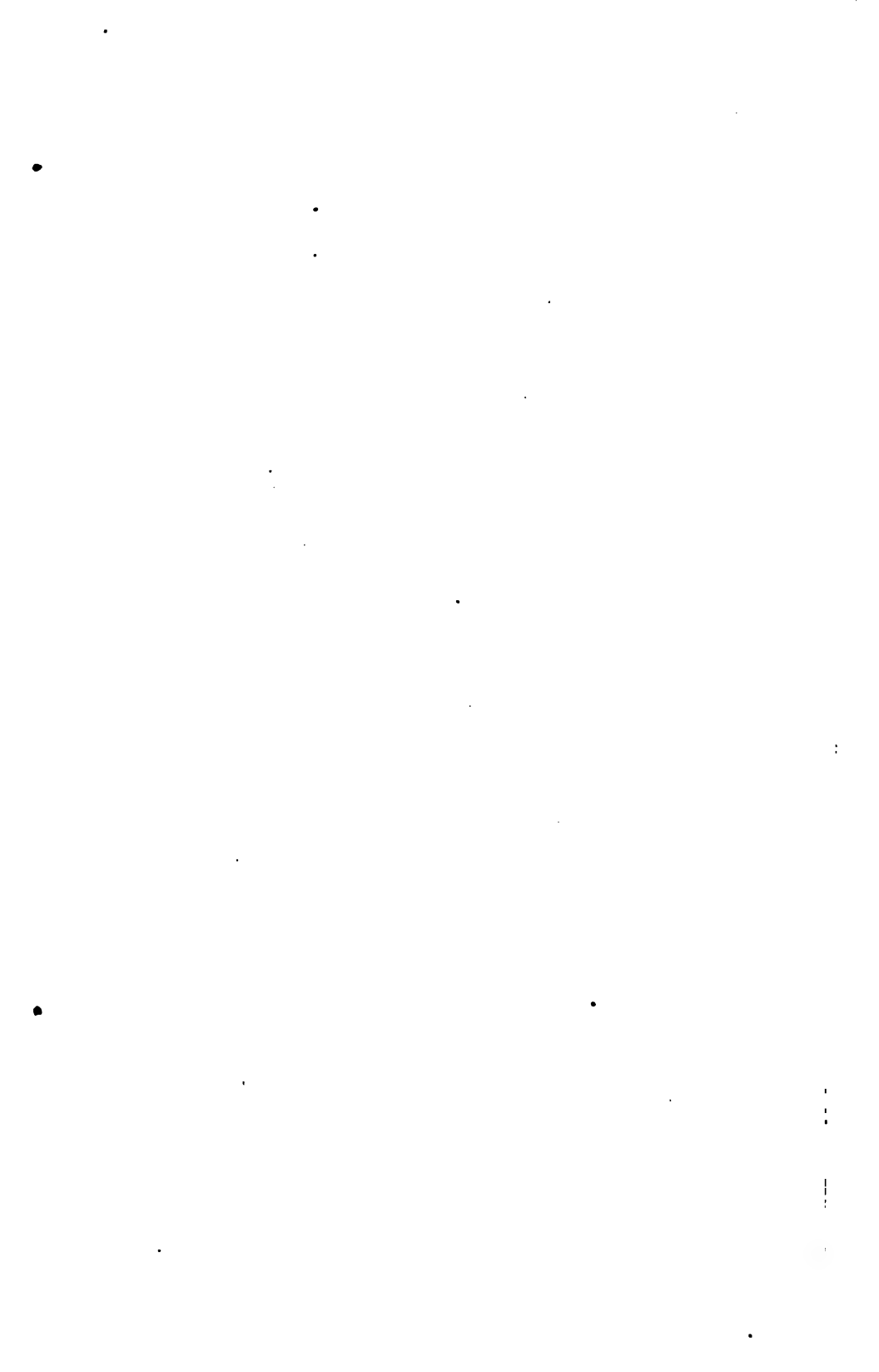


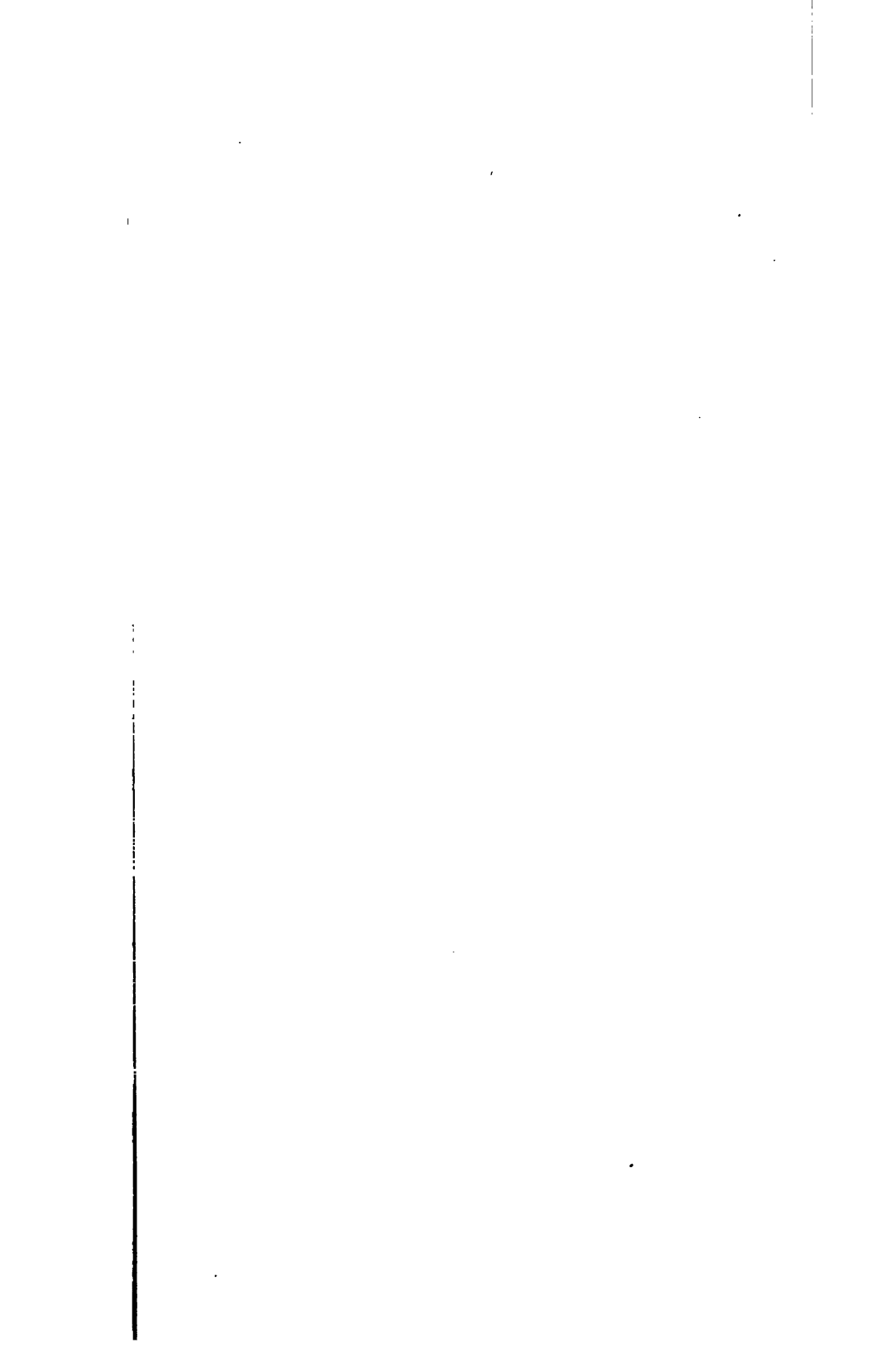


APPENDIX.

The Board of Health, while generally approving the papers presented in this report, are not responsible for the particular sentiments expressed.

BOARD OF HEALTH.





REPORT OF DEATHS

From June 30, 1886, to June 30, 1887, of those Dying in the State of California.

CAUSES OF DEATH.	SEXES.			AGES.									NATIVITIES.				
	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
Total																	
I.—ZYMOTIC OR EPIDEMIC.																	
Cholera	9	5	1	136	37	3		1	1	2	1	4	1	1	4	4	
Cholera morbus	216	92	32	136	37	3		1					39	207	4	4	1
Cholera infantum	118	50	39	46	23	1	2	4	8	6	4	11	13	72	16	17	13
Dysentery and Diarrhoea	18	10	5	3	2	2	1	1	4	1			3	3	9	3	3
Smallpox	34	18	13	3	9	17	1	1	1	1	1		4	28	2	2	2
Measles	60	28	26	6	5	31	8	2					6	54	2	2	2
Scarlatina	376	170	188	15	164	124	44	10	1	4		1	13	317	25	15	19
Diphtheria	164	79	72	13	100	33	7						11	133	4	2	5
Croup	64	31	23	10	36	21	1						6	62	1	0	1
Whooping cough	26	16	8	2	6	2	1			2	3	4		11	6	5	4
Erysipelas	21	9	10	2				2	4	3	3			11	6	3	1
Fever—Typho-malarial	289	152	105	32	4	14	24	64	31	25	15	24	32	97	70	81	41
Typhoid	43	23	16	4	3	7	1	5	6	2	7	4	4	16	16	8	3
Remittent and Intermittent	92	43	33	29	19	8	6	4	5	3	3	4	11	65	11	9	7
Cerebro-spinal	26	14	12	10				9		2	3	1		9	4	10	3
Syphilis																	
Alcoholism (direct or remote), including delirium tremens	112	76	22					6	12	24	28	18	24	6	35	56	15
II.—CONSTITUTIONAL DISEASES.																	
Hydrocephalus	62	30	5	25	24	2	2	1	3				5	43	9	4	6
Meningitis	221	115	81	25	60	75	14	9	9	8	8	3	23	163	22	21	9
Phthisis pulmonalis	1,617	940	487	190	9	5	116	446	294	253	155	102	218	309	497	604	207
Marasmus	353	167	152	34	20	3	2	11	14	13	12	32	36	189	40	60	64
Scrofula	10	4	6	1	3		2	2	1				1	5	1	3	1
Rheumatism	33	16	15				1	5	2	2	9	14		5	7	19	2

Cancer	300	119	154	27	2	1	3	15	24	71	64	84	36	21	78	107	34
III.—LOCAL DISEASES.																	
Pneumonia	611	338	216	57	59	10	18	52	70	72	65	97	99	191	128	214	78
Pleurisy	21	14	7	14	32	10	3	4	2	7	4	4	---	---	6	15	---
Bronchitis	186	87	85	14	57	---	---	6	7	10	12	30	19	90	21	59	16
Other diseases of respiratory organs	124	70	44	10	24	5	1	12	15	15	13	15	14	43	28	39	14
Enteritis	162	89	66	7	87	3	5	8	10	7	8	7	9	106	16	31	9
Gastritis	74	27	41	6	17	5	1	4	6	7	14	14	6	27	10	29	8
Gastro-enteritis	7	5	1	1	5	---	---	---	---	1	---	---	1	6	1	---	---
Peritonitis (non-puerperal)	115	46	62	7	10	2	9	23	17	23	10	8	7	38	27	43	9
Diseases of the liver	125	70	50	5	10	1	2	11	7	22	36	33	3	14	32	72	7
Other diseases of stomach and bowels	63	27	25	11	6	4	2	7	2	8	4	19	9	19	16	22	6
Bright's disease and nephritis	165	96	57	12	3	3	9	19	17	35	32	31	14	23	37	79	26
Aneurism	39	24	8	7	1	---	---	3	1	14	8	5	7	1	11	20	7
Heart diseases	546	307	204	55	9	10	20	51	47	93	100	159	72	61	169	253	83
Convulsions	195	108	77	10	133	45	2	3	---	1	---	1	7	185	2	5	3
Other diseases of brain and nervous system	190	107	64	19	15	3	9	10	12	30	29	43	20	48	48	69	25
IV.—DEVELOPMENTAL DISEASES.																	
Puerperal diseases	83	---	33	---	---	---	1	15	9	3	---	1	4	6	9	12	6
Old age	193	78	98	17	---	---	---	---	---	---	---	193	---	1	53	99	40
V.—EXTERNAL CAUSES.																	
Suicide	122	99	15	8	---	---	2	12	30	31	21	8	18	7	23	66	26
Heat, death from—sunstroke	2	2	---	---	---	---	1	---	---	1	---	---	---	---	---	2	---
All other causes not classified	2,702	1,660	768	274	105	44	83	216	299	332	258	412	650	655	469	1,098	480
Stillbirths	357	196	138	23	---	---	---	---	---	---	---	---	---	357	---	---	---
Totals	10,316	5,667	3,641	1,008	885	327	439	1,065	970	1,138	930	1,387	1,445	3,729	1,975	3,326	1,286

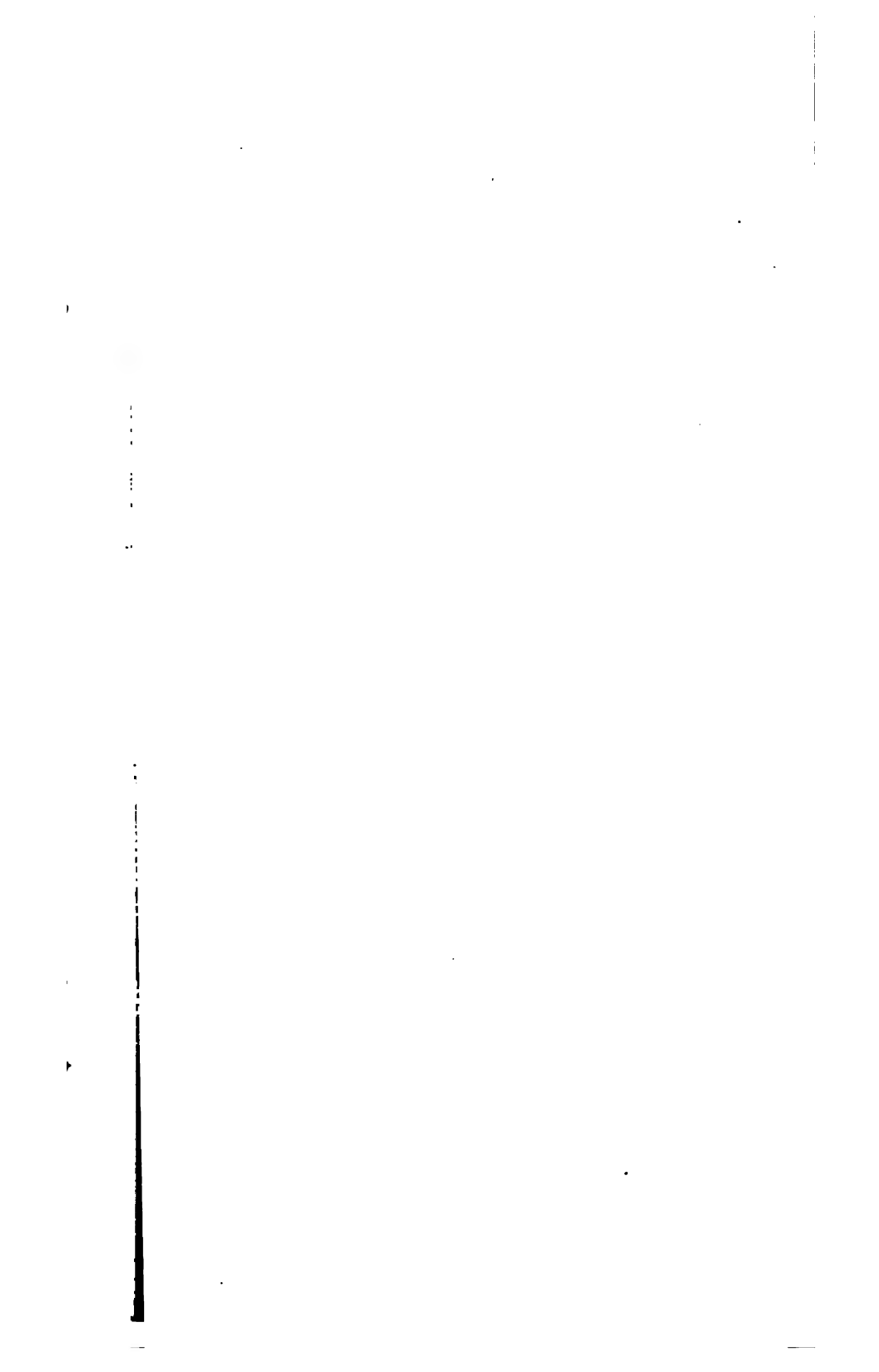
REPORT OF DEATHS

From June 30, 1887, to June 30, 1888, of those Dying in the State of California.

CAUSE OF DEATH.	SEXES.			AGES.									NATIVITIES.					
	Total	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—ZYMOTIC OR EPIDEMIC.																		
Cholera	27	16	10	1	3	2	2				5	1	12	2	12	3	12	
Cholera morbus	253	135	99	17	209	32	1	2						7	237	8	5	1
Cholera infantum	132	75	48	9	41	24	5	1	7	5	10	6	23	10	71	25	30	6
Diarrhoea and Dysentery	94	66	27	1	6	5	3	9	26	16	7	13	5	4	20	31	34	9
Smallpox	139	59	66	14	38	69	11	4	4	4			1	8	114	20	4	1
Measles	59	28	25	6	5	16	24	8	2					4	40	11	3	5
Scarlatina	358	174	163	21	14	172	93	35	5	2	1			36	283	49	15	11
Diphtheria	203	106	85	12	24	115	47	9		1	2			5	182	13	1	7
Croup	4	3	1		3	1									4			
Influenza	42	22	18	2	20	20	1								1	42		
Whooping cough	41	26	13	2	2		1	2	6	6	3	2	8	3	16	13	9	3
Erysipelas	29	12	13	4	2	6	1	2	7	5	2		3	1	17	9	2	1
Fever—Typho-malarial	414	242	166	16	1	40	37	94	115	42	30	10	14	31	165	109	110	30
Typhoid	80	43	34	3	12	6	3	8	13	9	8	5	13	3	29	26	20	6
Remittent and Intermittent	144	68	67	9	47	38	17	13	14	4	3		3	5	107	15	13	9
Cerebro-spinal	28	14	14		14				4	3	3			4	18	1	9	
Syphilis																		
Alcoholism (direct or remote), including delirium tremens	148	113	26	9			1		10	26	32	41	21	17	23	41	73	11
II.—CONSTITUTIONAL DISEASES.																		
Hydrocephalus	24	12	10	2	16	6	1	1							23			
Meningitis	289	158	121	10	79	115	20	23	11	12	8	8	6	7	214	40	26	9
Phthisis pulmonalis	1,832	1,136	592	102	8	28	8	112	506	411	298	152	126	182	355	533	782	112
Marasmus	333	203	128	2	229	16	4	3	34	6	9	5	26	1	238	33	34	28
Scrofula	9	4	4	1	2	4		1		1	5			1	7		1	1
Rheumatism	22	15	7		1		2	2	2	3		1	6		2	8	12	

Cancer.	317	151	100	6	11	25	79	77	107	18	24	108	167	18
III.—LOCAL DISEASES.														
Pneumonia	1,039	625	373	41	96	88	127	113	153	57	391	234	381	33
Pleurisy	26	15	9	2	2	6	2	2	7	1	9	6	10	1
Bronchitis	262	151	121	10	9	7	20	21	36	10	132	42	81	7
Other diseases of respiratory organs.	138	86	48	5	9	7	17	19	19	6	59	29	41	9
Enteritis	217	113	104	—	5	14	8	6	17	—	155	18	41	3
Gastritis	86	37	46	3	5	3	11	10	19	4	32	20	31	3
Gastro-enteritis	33	18	15	—	2	4	1	1	6	1	16	5	8	4
Peritonitis (non-puerperal)	124	56	68	—	25	22	13	12	20	4	34	31	56	3
Diseases of the liver	190	142	45	3	13	24	48	45	41	1	16	57	106	11
Other diseases of stomach and bowels.	84	53	27	4	4	10	4	16	14	2	32	18	32	2
Bright's disease and nephritis	221	145	71	5	30	24	51	44	51	2	27	67	115	12
Aneurism	33	30	3	—	—	7	14	7	5	—	—	11	21	1
Heart diseases	604	423	234	37	59	74	113	119	202	58	101	194	369	30
Convulsions	237	137	99	1	1	2	2	1	3	2	215	16	—	6
Other diseases of brain and nervous system	243	142	90	11	13	21	40	27	65	7	63	79	81	20
IV.—DEVELOPMENTAL DISEASES.														
Puerperal diseases	43	—	43	—	21	7	4	1	1	1	15	13	10	5
Old age	186	93	85	8	—	—	—	—	186	—	20	64	81	21
V.—EXTERNAL CAUSES.														
Suicide	136	116	18	2	36	31	20	13	16	11	18	43	68	7
Heat, death from—sunstroke	—	—	—	—	—	—	—	—	—	—	—	—	—	—
All other causes not classified	2,980	1,886	925	159	296	273	418	257	550	569	856	812	1,078	234
Stillbirths	329	57	39	233	—	—	—	—	—	—	326	—	—	3
Totals	12,322	8,197	3,350	773	1,405	1,209	1,419	1,035	1,785	1,086	4,760	2,905	3,973	682





APPENDIX.

The Board of Health, while generally approving the papers presented in this report, are not responsible for the particular sentiments expressed.

BOARD OF HEALTH.

SMALLPOX IN LOS ANGELES IN 1887.

By H. S. ORME, M.D., President State Board of Health.

The beginning of the year 1887, in our beautiful city of Los Angeles, was certainly auspicious. Capital and population were pouring in; new and gigantic enterprises were inaugurated every day; real estate values were increasing at fabulous rates; everything indicated a season of wonderful prosperity. The city was in a good sanitary condition, and as a health resort, especially, was becoming very popular, as was attested by the thousands of invalids who were making their homes in Los Angeles. The appearance of any epidemic disease interfering with this unprecedented prosperity would naturally be very unwelcome. So it is easy to picture the horror of our citizens when it became known that smallpox was in our midst.

The first cases reported to the Health Officer, Dr. J. S. Baker, were on February 16, 1887; J. B., 47 Vine Street, and F. W., 200 Main Street, near Third. Next day, four more cases were reported—Pedro L., corner Main and Seventh; Joe L., Seventh and Spring; F. C., 28 South Spring; and McN., at South Pasadena. Three others were added on the eighteenth—A. H., corner Castelar and Bellevue Avenue; W. P., St. Vincent's Hospital; and J. H., Missouri House, near Southern Pacific depot; and on the nineteenth, still another, José O., 238 Upper Main Street, making, in all, ten cases by the evening of the nineteenth, all of whom were immediately removed to the smallpox hospital, or carefully isolated at their homes. All of these first cases were young men, which fact, taken in connection with their being almost simultaneously affected, would indicate a common source of infection. Investigation since has served to well establish this theory, for it was proved that all these young men were in the habit of frequenting a certain variety theater in this city, where it is supposed that the infection was introduced by the clothing of some visiting Mexicans, smallpox being known to exist in Mexico at that time.

Of the ten cases, the one at South Pasadena died February twentieth, and four more on the twenty-second. As a natural sequence, the city, crowded at the time with thousands of health and pleasure seekers from the East and elsewhere, was on the verge of a panic.

Reports now began to come in of cases in other localities. At the Lugo settlement, nine miles from Los Angeles, three miles this side of Downey Post Office, three cases were reported on the twenty-seventh, one of variola, the others varioloid. These cases were easily traced to the corner of Seventh and Main streets, Los Angeles, whence Pedro L. had been removed to the smallpox hospital.

On the same day, February twenty-seventh, Dr. T. E. Ellis, of Elsinore, San Diego County, telegraphed to me that he had heard of a death from smallpox on the San Jacinto Plains, some twelve miles distant from Elsinore. A few days later Dr. Ellis reported by telegram the cases of two brothers, one only of whom had been vaccinated; the other afterwards died. All these parties had recently visited Los Angeles.

On the tenth of March a little nine-year old daughter of Mr. Andrew

Hay, a resident of the northern part of Los Angeles City, was taken, and died on the fourteenth. Mr. Hay immediately removed with the rest of his family to his ranch in Cahuenga School District, about ten miles from Los Angeles. But the rest of his children, three in number, were smitten with the disease almost simultaneously, and died respectively on the twenty-first, twenty-third, and twenty-seventh of the month. It was at first claimed by the family and their attendants, that these children had measles, and not smallpox, but that, notwithstanding, they were vaccinated and revaccinated, with resultant septicæmia and death. But from all the evidence obtainable, they were undoubtedly genuine cases of smallpox.

At Ravenna, fifty miles north of Los Angeles, on the line of the Southern Pacific Railroad, a case was reported to me, March seventh, through the County Board of Supervisors. I immediately notified Dr. J. S. Turner, of San Fernando, the Health Officer of that district, to investigate. That gentleman reported the case as doubtful, but prudently isolated it. It proved afterwards to be only measles. On the ninth, another case was reported. Dr. Turner at once visited the locality, and found a miner by the name of Beckwith, aged thirty-five, with symptoms of varioloid. Every precaution was taken to isolate the man, and the whole neighborhood was carefully vaccinated. The case developed slowly, and was very obscure from the beginning to the end, but the efficient precautions prevented any cases resulting therefrom. After this patient was discharged, an eruption appeared on his face, and attracted attention on the train as he was leaving the county, and it was thought best to detain him at the hospital for suspects in Los Angeles.

At Port Ballona, Dan. Mahoney, a laborer on the wharf, aged thirty-five, after a spree in Los Angeles, returned to his work, and soon after (March twenty-seventh) developed a virulent case of variola, which caused his death April second.

At Green Meadows, about ten miles southwest of Los Angeles, four cases were reported to me during the month of March, in the McLane family—released April nineteenth.

At the Vernon District, near the eastern city limits, seven cases were reported on the ranch of Diego Lopez, a native Californian. These cases were scattered along through March and April, and the last were discharged May fourteenth.

Santa Monica had one case, reported March fifteenth, by Dr. E. C. Folsom; a child with varioloid.

South Pasadena, in all, reported eight cases, with one death; the first.

At Alhambra, close to South Pasadena, nine cases were reported in the Wallace family; three of variola, the others varioloid.

At Ontario, San Bernardino County, about thirty-five miles from Los Angeles, and on the line of the Southern Pacific Railroad, Dr. Elwood Chaffey reported a case of variola and one of varioloid March fifteenth; and another, April twenty-sixth, at Cucamonga, near Ontario. These cases also were easily traced to Los Angeles.

From San Buenaventura, Dr. R. E. Curran telegraphed March fourteenth the report of one case, "imported from Los Angeles."

At San Diego, Dr. Magee, Health Officer, reports to date, June first, a total of twelve cases, with two deaths. One of these was a little native California boy, aged twelve, named Pedro Garcia, who, with his little sister, aged eight, had been sent from Los Angeles to the Mission School in Old San Diego, hoping to avoid the disease which had already afflicted one member of the family living in another part of the city, but they were both

taken sick and admitted to the smallpox hospital March twenty-third. At this writing, June third, Dr. D. B. Northrup, the present Health Officer, reports that the disease has disappeared from the county, but that he has heard of a few cases at Ensenada, on the peninsula of Lower California.

In this city, up to date, June first, we have had in all one hundred and twenty cases, fifteen of which proved fatal. In the county, outside the city, fifty-six cases were reported, with six deaths. In other counties, twenty cases and four deaths; thus making a total of one hundred and ninety-six cases, with twenty-five deaths.

The mortality, about 12½ per cent, is much less than we usually observe in epidemics of other diseases. A noticeable fact is the general absence of the usual disfiguration, very few cases showing any trace of the disease. From these facts we naturally infer first, a mild form of the disease; second, efficient and faithful treatment by those in charge.

The simultaneous appearance of seven or eight cases of smallpox, some of them being actually picked up on the streets, supplemented by the death of four of them on the same day, was necessarily startling. Exaggerated statements flew from corner to corner, and rumor soon located cases at the various hotels. Wherever a doctor was seen to enter, the inference was, "another case of smallpox." The papers of San Francisco and other places took up the cry, and Los Angeles was declared to be overrun with the plague, before, in reality, a dozen cases existed. Our city was crowded with strangers, and, of course, more or less excitement ensued; and it is estimated that at least ten thousand left the city in one week. On the other hand, there was a disposition on the part of our city press to err as badly in the other extreme. Our daily papers asserted editorially that only a very few sporadic cases existed, that these were very mild, that the disease was under perfect control, that there was no possibility of an epidemic, and no necessity for alarm.

Some of our leading physicians, and others, seemed to recognize the danger at once, and by communications to the press, and to those in authority, did all in their power, not to unnecessarily alarm the public, but to arouse it, before it should be too late, to some organized system of resistance. These worthy efforts were belittled, and the projectors ridiculed. Instead of coöperating, and doing all in their power to throttle the disease in its first visitations, these would-be sanitarians scoffed and sneered. Nothing should interfere with our boom—travel should be unimpeded, passengers should be allowed to circulate with perfect freedom, and the bare thought of a possible quarantine caused a perfect howl of indignation. The result of this was to make people comparatively careless. 'Tis true, that at first the number of cases was comparatively small, and, in fact, in the city never exceeded twenty at any one time. But with prompt and concerted action in the beginning, the disease could have been stamped out at once, and many lives and much expense would have been saved. As it was, a great many of our citizens, influenced by the statements of our city press, underestimated the necessity for stringent measures, opposed and thwarted those who tried to prevent the spread of the disease, and thus, directly and indirectly, were the cause of its being as serious as it was. Cases were actually kept carefully concealed by their friends, because they did not believe in vaccination, and did not wish to submit to the inconveniences of isolation, or the smallpox hospital. Thus the contagion was allowed to spread to others, and many cases are traceable to just such exposure.

In several instances well authenticated cases were under the care of irregulars and quacks, who, from ignorance, or, perhaps, selfish motives, failed to recognize the nature of the disease, and carelessly permitted its dissem-

ination. In a few instances, chiefly in the beginning, cases of varioloid were mistaken for measles and chickenpox, and unnecessary exposures multiplied the foci of contagion. On the other hand, one or two cases of measles and chickenpox, in the excitement of the hour, were mistaken for smallpox, and the unfortunates isolated from friends and relatives, till the error in diagnosis was established. One of our county officials was a notable case in point. One woman, having been treated three years previous for supposed variola, came down from San Francisco, and was permitted to enter the smallpox hospital to nurse her father. She soon developed the disease, and came near dying. I think, in all, fifteen cases or more were carefully concealed from the Health Officer, and not discovered till, in some instances, death or convalescence had taken place.

Dr. W. A. Brown, of Downey Post Office, mentions meeting a tramp who had smallpox unmistakably, but who escaped into the willows before he could be secured, and although he was seen by others afterwards, he was never "corralled." No doubt there were other similar cases.

The last case near Downey is said to have been caused by infected clothing, which a discharged patient from the Los Angeles Hospital had smuggled away with him, although it was supposed that they had been destroyed according to orders. It is also said that the hack used in transporting some of the original cases was, by neglecting disinfection, the instrument of spreading the disease to several later cases.

These cases are cited as instances where, either through neglect or oversight, the employment of proper preventive measures were omitted, and the disease thus permitted to spread.

As soon as it was known that there were cases of smallpox in Los Angeles City, I addressed a *private* circular letter to a number of well known and reliable physicians throughout Southern California and Arizona, notifying them of the existence of the disease, and asking their assistance in discovering its origin, and in limiting its further ravages. I also addressed a communication to the County Board of Supervisors, calling their attention to the necessity of prompt and active measures, and asking that competent persons be appointed as Health Officers in each town or township, whose duty should be to investigate all reported cases, and, as far as possible, prevent any further dissemination of the disease. I give this communication in full:

To the honorable Board of Supervisors, Los Angeles County:

GENTLEMEN: As a member of the State Board of Health, and as an old citizen and taxpayer, I deem it my duty, in a few words, to call your Board's attention to the presence of smallpox in our city and county, and to inform you that the disease threatens to prove epidemic if it is not speedily "stamped out," either by general vaccination or strict quarantine.

That it must be stamped out no one will deny; when or how soon I wish some one could tell.

So far it has made its appearance (imported from Mexico) in two localities outside of Los Angeles—South Pasadena, and at the Lugo settlement nine miles from the city. A case of varioloid was reported near Anaheim, which puzzled two physicians, and which was very properly promptly quarantined; but, fortunately, it proved to be a severe case of varicella, closely resembling varioloid, and the quarantine was raised.

As soon as the first cases of smallpox in the county were reported, Supervisors Rowan and Macey, acting for the Board, under the law, employed a competent physician at Pasadena to act as Health Officer—to enforce strict quarantine, and to purchase vaccine virus, and to enforce vaccination. Fortunately, owing to the prompt measures and action then taken by your Board, no other cases have been reported from South Pasadena, outside of the family originally infected. The whole district has been, and is now, under close and strict inspection, and it is to be hoped that we will not hear of any more cases in that locality, unless it should make its appearance at San Gabriel among the native Californians, who refuse vaccination.

At Lugo's the disease was carried from this city, from the corner of Seventh and Main

streets. At that settlement we have five cases *reported to date*—one of smallpox proper, the others varioloid.

Dr. J. Turner, of Los Angeles, by order, first went out to inspect these cases, then only three, on Sunday, February twenty-seventh, and again on the twenty-eighth. He quarantined them and put up a yellow flag, etc; offered and tried to vaccinate all exposed, *but was refused*. Dr. W. A. Brown, of Downey City, has since, by order of Supervisor Venable, been acting as Health Officer in that section, and has, and is now doing, I understand, good work.

This loathsome disease must be arrested, and as quickly as possible, and can only be stamped out by general vaccination, and by prompt and vigorous action on the part of your honorable Board and the city health authorities. So far, some good and satisfactory work has been done, but I am sorry to inform you that the disease, after a lull for about a week, is again on the increase in the city, and it is to be feared will be carried out into the several towns and districts throughout the county.

Such, gentlemen, are the facts. The State Board of Health, apprehending the invasion of the disease, endeavored two years ago to get an appropriation from the Legislature "for a contingent epidemic fund," to be used to prevent the introduction of contagious and infectious diseases into the State, especially this southern section, exposed, as we are, both by rail and sea, on account of our proximity to Mexico. All efforts failed, and again this season an effort was made, and only a few days ago have we succeeded at last in getting one half the appropriation asked for; but it is too late this season to establish quarantine on the line of the Southern Pacific Railroad; the disease is already in our midst. But as sanitarians and Health Officers of the State, I can assure you on behalf of our State Board of Health, that we will do our utmost to assist your Board of Supervisors in stamping out the pest, and would suggest that whatever action your Board may now take, should be prompt and effectual, no half-way measures; competent Health Officers and Health Boards, with full power to act, should be appointed in every town and district in the county. General vaccination and quarantine should be enforced, and then by diligent, continuous watchfulness and care, it is to be hoped that in a reasonable length of time your Health Officers will be able to report a clean bill of health for the whole county.

Perhaps it is needless to say to you that I am in close daily communication, both by mail and by wire, with all parts of our county, as well as the whole State; and as said before, it is only by united, continuous, proper, and prompt action can we hope to soon get rid of this threatened epidemic of smallpox.

All of which is respectfully submitted by—

H. S. ORME, M.D.,
For State Board of Health.

On receipt of this report, the Board immediately requested me to assist in appointing such men as were competent, and a corps of active and intelligent physicians was at once selected, with instructions to ferret out every case, and to provide for its complete isolation and proper treatment. Efficient agents were employed to keep watch, and report all suspects, so that within fifteen minutes after the discovery of a case a competent physician would be in charge. Thus everything possible was done both to carefully attend to patients, and to prevent further spread of the disease. Printed instructions to physicians, with reference to vaccination, treatment, disinfection, etc., and the same to the public, informing them on sanitary matters, were distributed freely among the people. Every effort was made to stamp out the disease at once.

The matter becoming still more serious, as President of the State Board of Health I felt it my duty to call a meeting of the State Board at Los Angeles, to consider the advisability of still more active measures; and Dr. Tyrrell, the Secretary of the Board, with Drs. Cole, Simpson, and Crowder, comprising a majority of the Board, arrived in the city March thirteenth. On the fourteenth, by request of Mayor Workman, a conference was held with the city authorities, and the proper management of the disease, which was rapidly becoming epidemic, was discussed and agreed upon; and at the request of the Mayor, a public meeting was called for the purpose of apprising the people of the danger of the situation, and arriving at some definite plan of action. Universal vaccination from house to house, and the complete isolation of every case as soon as discovered, with thorough disinfection, was recommended. It was also decided to consult the railroad authorities, who readily promised and *gave* their active coöperation in detaining and fumigating infected trains, vaccinating employes, etc.

It was also decided to appoint Medical Inspectors along the lines of travel entering California, whose duty it should be to inspect all trains and vessels, and detain every case of a suspicious nature, vaccinate all passengers exposed, etc.

The State Board then made an official visit to San Diego on the fifteenth, and found they had had one fatal case of smallpox, contracted at El Paso—a lady tourist. Her husband was afterwards taken, and detained at the smallpox hospital. Returning, they visited San Bernardino, interviewing Mr. J. N. Victor, Superintendent of the California Southern Railroad. Thence they went to San Pedro, and back to Los Angeles. Each of these points was carefully inspected, and the railroad, and other authorities, impressed with the importance of active coöperation, which they promised and gave. The following physicians were appointed by the Board as Inspectors: Dr. Thomas L. Magee, at San Diego; Dr. W. A. Weldon, at San Pedro; Drs. J. J. Choate and C. P. Brierly, at Colton; Dr. Q. J. Rowley, at Mojave; Dr. H. J. Bordè, at Tulare City, with Dr. M. F. Price as consultant at Colton. Printed instructions as follows were given these gentlemen by the State Board, and faithfully carried out:

STATE BOARD OF HEALTH.

Instructions to Medical Inspectors for the State Board of Health.

— — —, M.D.:

DEAR SIR: You are hereby appointed Medical Inspector for the State Board of Health for the district between — — —, and the following general rules are published for your guidance:

You will take a convenient position at your assigned station and inspect the emigrant cars on their arrival, at the same time making inquiries of the passengers as to the existence of any sickness on board at the time, or as to there having been any eruptive form of disease among them since leaving — — —. In this investigation valuable information may be obtained from the conductor and other employes of the train.

Should any case of smallpox be discovered upon any car, you will direct said car to be quarantined, or side-tracked, at a point suited to the well being and comfort of the sick, and at the same time adapted to the convenience of the railroad company. It is desired that the work to be done should so be ordered and conducted as to subject the company to the minimum of inconvenience consistent with its energetic and efficient discharge in the interest of public health.

The other passengers on infected cars should be transferred to another car, but not mixed with passengers on uninfected cars. You will examine them carefully to ascertain whether there are any unvaccinated persons among them. All such should be immediately vaccinated, making at least two points of insertion. You will also vaccinate all upon the infected car, and detain them for a period of twelve days from the date of their exposure to the disease.

You will also inspect the express trains, and satisfy yourself that no cases of smallpox were on board. In this examination the conductor and other employes of the cars will be of essential service to you. Should you be satisfied of the presence of smallpox, you will adopt the means just recommended for emigrant cars.

If, upon inquiry, you find that any passenger upon a car has been sick with smallpox during the trip, and has died or been removed from the car, you will consider such car to be infected, and proceed therewith in the manner directed for cars upon which smallpox has actually been discovered.

When any car containing smallpox has been quarantined, you will aid the railroad authorities in seeing that the passengers thereon are well and comfortably cared for, and that the car, after the recovery or removal of the sick, is thoroughly disinfected, according to the rules laid down in the general instructions for disinfection issued by the State Board of Health.

You will be expected to keep a record of cars quarantined, cases of smallpox discovered, and vaccinations and revaccinations performed, and of every other proceeding under the duties assigned you, and to report the same in writing to the Secretary of the State Board of Health at Sacramento at least every third day.

The duties to which you are assigned are important, yet delicate, and the State Board of Health trusts to your discretion and good judgment so that they be exercised with prudence, and with an endeavor to disarm opposition by a courteous and dignified appeal to reason, and the demonstration of the necessity of the measures adopted, rather than by the exhibition of arbitrary authority.

By order of the State Board of Health.

G. G. TYRRELL, M.D.,
Secretary State Board of Health, Sacramento.

Previous to this, arrangements had been made by the city authorities with the Sisters of Charity by which they agreed to assume entire charge of the smallpox hospital, furnishing provisions, cooks, medicines, and everything required, except bedding, fuel, and such male assistants as were necessary; these to be furnished by the city, the Sisters to receive \$3 per day per patient. A similar arrangement had been made with the Sisters during a previous epidemic in 1868, also in 1873. The smallpox hospital was not a popular suburb, and many efforts were made to have it removed to another locality, the residents in the vicinity claiming that several cases occurred in that neighborhood through the proximity of the pesthouse. The difficulty of securing another site for so objectionable an institution, however, caused the removal to be abandoned, and the hospital remains in the same place.

EXPENSES.

The direct expenses to the city and county of this campaign against smallpox, extending over nearly four months of time and a great expanse of territory, were necessarily great. Eighteen thousand dollars is the estimated cost to the city, \$12,000 additional to the county; and indirectly many thousands more must be added to our losses. Physicians were employed at \$10 per day. Nurses exacted very high wages. In fact, nothing could be done in connection with the disease that did not cost a fabulous price. Many cases proved spurious, but the expense of investigation was of course the same. Then the care of cases in families extending over months, at distant points, involved the expenditure frequently of many hundreds of dollars. It was made manifest to our city and county authorities that everybody expected to be well paid for handling smallpox.

In the Ballona case, particularly, there was great demoralization. Nurses were engaged who failed to report, and others employed spent their time in carousing to the utter neglect of their charge, and then demanded \$10 per day for their services.

LESSONS OF THE EPIDEMIC.

There are two important lessons to be learned from our late epidemic. First, that isolation and quarantine, though highly important, are not sufficient in themselves to stamp out the disease; they must be supplemented by vaccination. Second, that vaccination, as it is often performed, is no protection whatever. Thorough vaccination and revaccination is an almost absolute preventive.

Absolute and perfect isolation is generally very difficult. In a crowded city it is well nigh impossible. In an open country it can sometimes be accomplished; but even here the most stringent measures fail to make the quarantine absolute, generally through want of sympathy and coöperation on the part of the family; sometimes in spite of these. As an instance, may be cited the case of Mr. Andrew Hay's hired man, who developed smallpox some time after the death of Mr. Hay's children. The man was very careful not to enter the house at all, and it is supposed he contracted the contagion by fondling a pet dog that had been allowed access to the children.

While in most cases the people recognized the importance of the preventive means adopted by the physicians, instances were too frequent in which violent opposition was encountered by Health Officers, and every effort to vaccinate, fumigate, or isolate was met with open defiance. In one family in particular, a case of variola occurred, and when physicians were sent to vaccinate the rest of the family, and to disinfect the house, they were

violently resisted, and in two weeks others of the family contracted the disease, just through their refusal to take proper precaution.

It is a significant fact, that when cases were promptly reported and taken to the hospital there was no further contagion from that source. But when the cases were allowed to remain at home, it frequently spread to others.

It is a well established fact that vaccination is a preventive of smallpox. Yet there still lingers among many of the native Californians and ignorant classes a prejudice against it. Especially do they object, like the French population of Montreal, to be vaccinated during the prevalence of an epidemic. And even among those who should show more intelligence and better information, we find, now and then, the most bitter hostility to this simple procedure. One of our worst cases was a young man from Massachusetts, whose State laws require every child to be vaccinated before he can enter the public schools. Through prejudice in his family he had never been vaccinated. The folly of their course was probably fully apparent to him before he recovered.

Another instance, in a family who came three years previous from Canada. The mother favored vaccination—the father objected; but on the appearance of the disease in Los Angeles, the children were sent to me to be vaccinated, one of them being quite unwell at the time. Two days later I was called to their house and found the little girl who had been complaining sick with genuine variola. I immediately revaccinated the mother. There was but the one case in the family, which ought surely to convince the father of the utility and necessity of vaccination. This last case, I think, I have traced to their school, where children were in attendance from families in which were concealed cases of smallpox at the time.

With everybody vaccinated, there would be no smallpox, and there should be a law making vaccination compulsory. The medical societies everywhere, voicing the expressions of their individual members, heartily and unanimously favor it. In many States, and in San Francisco and Sacramento, the public schools are open only to those who have been vaccinated, which is a move in the right direction.

Vaccinations frequently fail. In Los Angeles, of thirty thousand vaccinations, at least one third had to be repeated. To this fact much of the prejudice against it may be justly attributed. Cases of smallpox occurring in those who have been vaccinated are often cited by the opponents of the system. These cases are always those in whom the vaccination has been imperfect, or in whom the protection period has lapsed. The act has been performed, but with negative results. The virus, through age, or something else, has no power, and does not "take." Or, in some cases, it takes, but after some years the individual loses his immunity, and should be revaccinated, but is not. Still, because he contracts the disease, he claims that the whole theory of vaccination is wrong, and raises his voice against it.

The experience of the world has proven, unmistakably, that vaccination, properly performed, with good virus, and repeated every seven or eight years, is an absolute protection.

Failures are, unfortunately, too numerous, but should make us only the more careful. We should keep a primary vaccination in sight until we know that the work is good. In our late epidemic, the number of revaccinations was very large. The points furnished in some instances seemed absolutely worthless. Why, does not appear. It may be that in transit the points became defective, or possibly were not properly dipped. The points are always carefully packed, and protected from atmospheric influences. Still the fact remains that but few of them were effective.

The advantages to us of a vaccine farm on this coast would be great. Then we could be sure of obtaining fresh material. About a year ago an effort was made to establish a vaccine farm in Southern California, by a very competent man, but he died while making the necessary arrangements, and nothing further has been done. But we understand that the subject is again being agitated, and hope for a practical result.

Our last cases were all among those who refused vaccination. In more than one instance physicians were sent to vaccinate families who resisted, and afterwards suffered for their ignorant prejudice.

Our people need enlightenment in regard to sanitary matters. Much has been done already, but much remains to be done. When thorough vaccination and revaccination are systematically and regularly performed, there will be no material left for this dreadful scourge. Until then we will be subject, every few years, to visitations of this easily avoided pest.

In concluding, it may not be out of place to notice the hostility shown by the press of our city on the occasion of the visit of our State Board of Health. Even the individual members of the Board were attacked in the most shameful manner, and all sorts of improper motives assigned as actuating them in the performance of their duty. They were accused of a desire to quarantine the city through jealousy. Because of our wonderful prosperity these gentlemen were supposed to be enviously trying to injure us. Even though it was apparently forgotten that the members of the Board were honorable gentlemen, it ought to have been remembered that they were officers, sworn to the proper performance of their duty, and that, in the general welfare, they could not be supposed to discriminate in favor of any particular section to the detriment of the whole. It should not be forgotten that the President of the Board was himself an old citizen of the city, and as much alive to its welfare as any editor of any paper in Los Angeles. The members of the State Board worked faithfully for the interests of the whole State, and gave an amount of time and personal attention to the matter for which they will never be adequately recompensed.

TABLE OF CASES.

LOCALITY.	Number Cases.	Number Deaths.
Ballona.....	1	1
Cahuenga.....	4	4
Downey.....	21	None.
Alhambra.....	9	None.
South Pasadena.....	8	1
Green Meadows.....	4	None.
Vernon District.....	7	None.
Ravenna.....	1	None.
Santa Monica.....	1	None.
Total of county, exclusive of city.....	56	6
Los Angeles City.....	120	15
San Diego City.....	12	2
Elsinore.....	3	2
Ontario.....	3	None.
San Buenaventura.....	2	None.
	20	4
Grand total.....	196	25

SUPPLEMENTAL REPORT.

By H. S. ORME, M.D., President.

The following correspondence occurred in regard to the interests of Southern California as to the smallpox:

BOARD OF TRADE, LOS ANGELES, CAL., }
December 31, 1887. }

T. E. ROWAN, *Esq.*, Chairman Board of Supervisors, Los Angeles County:

DEAR SIR: For several weeks past the attention of our people has been called to the dispatches appearing in our papers relative to the rapid spread of smallpox in San Francisco. On the twenty-ninth instant, at a meeting of the Board of Health of that city, the Board passed a resolution declaring the smallpox epidemic, and stringent measures were ordered to fight the disease.

Self preservation is the first law of nature, and the rule applies as well to communities as to individuals. I am directed, therefore, on the part of the Directors of this Board, through its President, Mr. Eugene Germain, to call your attention, and that of your honorable Board, to the existing state of affairs in that city, and to suggest that it would be eminently proper, on the part of the Board of Supervisors, to take immediate action to prevent, as far as practicable, the advent of that dread disease into our city; at least so far as it can be prevented from reaching us from San Francisco over the ordinary routes of travel, viz.: via railroad and steamer.

Quarantine officers stationed at San Pedro and at Tulare, on the Southern Pacific, acting under your authority, would, in our opinion, be the least precaution that our community could take.

I am directed further to suggest that you call a special meeting of your Board, to take immediate action.

Very respectfully yours,

A. M. LAWRENCE, Secretary.

LOS ANGELES, CALIFORNIA, }
December 31, 1887. }

T. E. ROWAN, *Esq.*, Chairman Board of Supervisors, Los Angeles County:

DEAR SIR: Your request, made to me at your special meeting held this day, to answer the letter of the Los Angeles Board of Trade of even date, is at hand.

They suggest that the Board of Supervisors take such measures as will prevent the appearance of smallpox in our midst, and in their letter they state: "Quarantine officers stationed at San Pedro and at Tulare on the line of the Southern Pacific, acting under your authority, would in our (their) opinion be the least precaution that our community could take."

Would say in reply, first, that your Board ought to appoint a competent Health Officer both at San Pedro and Newhall, and in fact in every unincorporated town and also township in the county. Tulare is not in this county, hence I mention Newhall.

The State Board of Health will in the future, as in the past, exert itself to the utmost to assist the proper authorities in each and every section of the State to "stamp out" the smallpox and every other contagious and infectious disease which may threaten the people.

From the active and earnest coöperation the State Board of Health received from your Board of Supervisors early in the year, we have no doubt that you can assure the Los Angeles Board of Trade and the citizens of Los Angeles County, that everything possible will be done to speedily eradicate the disease upon its first appearance in this section.

In conclusion, I would state that I have just telegraphed Dr. Tyrrell, Permanent Secretary of the State Board of Health, to call a meeting of the Board at once, when the whole subject-matter of protecting the State from a threatened epidemic of smallpox will receive most careful consideration, and the most effective measures will be speedily adopted.

All of which is respectfully submitted by—

H. S. ORME, M.D.,
President of State Board of Health.

The next case of smallpox reported in Los Angeles was on the eighth day of December, 1887, being a Chinaman, Ah Sin, lately arrived from San Francisco, where the disease was prevalent. He had been sick about eight or ten days in Chinatown when discovered. He was immediately removed to the smallpox hospital, and the surroundings thoroughly disinfected. This case was soon followed by a negro, Tom Worthan, who had

lived near the Chinaman, and from that time until the present (July, 1888) cases have been reported at intervals all over the city.

When the Chinaman was discovered, December 8, 1887, Dr. Hagan was Health Officer, which position he continued to hold until February 16, 1888. Doctors Thompson and Cole were his assistants. After this date Dr. J. W. Reese took charge as City Health Officer. During the incumbency of Dr. Hagan, the State Board of Health was promptly informed upon the appearance and location of every case of smallpox, and the coöperation of the Board sought and cheerfully given in "stamping out" the disease. A tent for free vaccination was erected on the City Hall lot, on Fort Street, where over three thousand persons were vaccinated. As soon as a case of smallpox was reported, it was immediately visited, and if the diagnosis was confirmed, the patient was at once removed to the smallpox hospital. The house where it was found was thoroughly disinfected, and all the inhabitants of the locality vaccinated. Owing to these precautions it is said that during the administration of Dr. Hagan, with the exception of the Chinaman and negro above mentioned, there were no two cases of the disease from the same neighborhood.

The whole number of cases reported by Dr. Hagan to the State Board of Health from December 8, 1887, to February 16, 1888, was twelve, with one case on hand in the hospital, and three convalescent, the day his successor (Dr. J. W. Reese) assumed charge.

About this time, the ground being needed for building purposes, the vaccinating tent was removed, and in various ways an attempt was made to create the impression that the disease had disappeared from our midst. The State Board of Health, whose duty it is to keep informed on such matters, through its President and its Secretary, several times kindly requested of the Health Officer of Los Angeles for information as to the exact number of cases and their location, being willing and anxious to coöperate in suppressing the disease. However, no exact official information has been furnished the State Board of Health, but I was verbally informed about the eleventh of June by the Health Officer, that he had reported to the City Board of Health one hundred and ten cases up to that date. Cases have occurred since. The last case is said to have been discharged from the smallpox hospital on August 22, 1888. To the misfortune of our city, it is easier to suppress information concerning the disease than to exterminate the disease itself.

During the late epidemic very great need was felt for a suitable smallpox hospital, which, indeed, should have been built more than a year ago. Ten or fifteen years since, the present hospital was built just at the close of an epidemic, and thus, to our shame, blunders multiply.

It is undoubtedly a great mistake to erect expensive buildings for this purpose, in which patients are crowded, with many in a ward filling the air with germs of disease and causing to a great extent the terrible sequelæ of blood poisoning that so often follows variola, and causes many deaths. The pavilion plan, or a group of isolated cottages, is the best, as it is airy, disconnected, and affords much better ventilation than the ordinary style of building. At a safe distance there should be a house of detention where doubtful cases could be kept until the diagnosis became certain. During the last season several cases of measles and other exanthemata were mistaken for smallpox, one of which was sent to the pesthouse, where he contracted the genuine disease. A house of detention would have prevented such an unfortunate occurrence.

There should be an ambulance attached to the hospital, and under no circumstances should a patient be removed in a private or public convey-

ance. During the past season at least two cases, one of which ended in death, could, with considerable certainty, be traced to negligence in this respect.

Houses and localities that have been infected in the past should be watched with suspicion; and when it is known that a house is infected, the proper way is to quarantine it with all its inmates, and not, as was the case this year, to close the house against its occupants, thus sending them throughout the city—so many fresh foci of contagion.

The City Health Officer should be obliged to forego private practice and devote all his time to his official duties; and especially ought this to be the case during the prevalence of any epidemic contagious disease. *Vaccination, isolation, and disinfection* should be our watchwords; with these *thoroughly enforced* we can bid defiance to smallpox.

The following is a brief resumé of the cases of smallpox which occurred in Southern California during the past season:

Los Angeles City (estimated).....	115 to 125 cases.
San Fernando.....	3 cases.
Whittier.....	8 cases.
Duarte.....	2 cases.
La Ballona.....	2 cases.
Alhambra.....	1 case.
San Pedro.....	1 case.
Pomona.....	1 case.
Santa Barbara.....	1 case.
San Bernardino.....	3 cases.
Riverside (2 deaths).....	8 cases.
Ontario.....	1 case.
San Diego City.....	7 cases.
Moosa Cañon (3 deaths).....	6 cases.

The number of cases, it will be seen, was at least one hundred and sixty-five, of which number about one hundred and twenty-five occurred in the city of Los Angeles; and of the cases occurring in the surrounding country, the infection of the greater number can be traced directly to Los Angeles.

For example, the eight cases at Whittier originated from two cases which were both traced to this city. These cases were under the efficient care of Dr. Q. J. Rowley, of Downey City; and there would no doubt have been fewer cases if the citizens of Whittier had not acted so peculiarly, in persisting for several days that the disease was not smallpox, although experienced physicians had twice confirmed the diagnosis.

At La Ballona the first case reported was on May thirtieth, a native Californian, aged thirty-five, who had contracted the smallpox while on a visit to Los Angeles. Eighteen days afterwards his child, whom they refused to have vaccinated, contracted the disease. These cases were carefully looked after, and no others resulted therefrom. On June nineteenth Maggie Ybarra, aged about thirteen, living at No. 142 Yale street, Los Angeles, was taken to La Ballona, feeling slightly unwell; three days afterwards (June twenty-second) she was brought back to the city and put in the smallpox hospital. Her little brother, aged about nine years, had been left with relatives at No. 442 New High Street, was taken with the disease on June twenty-fifth, and reported to the Health Officer June twenty-eighth, showing the same origin for the two cases.

EXPENSES.

During the former epidemic (1887), there were one hundred and twenty cases of smallpox, which, as has been shown, cost the city \$18,000; and

as there were probably about one hundred and twenty-five cases this year (rumor says more), it is presumed that the expense to the city will be nearly as great. We allude to this item always of interest to the citizen and taxpayer, to show that any epidemic disease is a very expensive luxury, and to still further prove the old, true, trite saying that "Prevention is better than cure."

* * * * *

With his consent, I append the able report of Dr. L. S. Thompson, who had charge of the smallpox hospital (being resident physician) during the last season, and will call particular attention to the cases cited showing the great protective power of vaccination. It is plain to all progressive practitioners that "preventive medicine" will be the medicine of the future, and we who have had the longest and most extensive experience, know that simply because a man is an M.D. he need not necessarily be a sanitarian. Also, we take pleasure in submitting the report of Dr. West Hughes, who, at my request, acted for the Board of Supervisors of Los Angeles County, as Health Officer at San Fernando, and who held the disease in check by his thoughtful and prompt action in the matters of vaccination, isolation, and disinfection.

To the Mayor and members of the Board of Health:

GENTLEMEN: I beg leave to submit to you as briefly as possible this report covering the period of my incumbency as physician in charge of the smallpox hospital. From the beginning until the end of my duties I had under treatment eighty-nine patients, five of whom died, being a fatality of about one in eighteen, or a little less than 6 per cent; making, so far as I can learn, the best record in this country. The result in smallpox hospitals, so far as my knowledge goes—and according to the best authorities—ranges from 15 to 50 per cent. Of the eighty-nine cases, fifty-one (or about 60 per cent) had never been vaccinated; twenty-one had been vaccinated more than twenty years previously; eight more than ten years ago; and one, a German, claimed to have been successfully vaccinated but three months previously—but as he was at the time suffering from oak poison, it is probable that the sore following the abrasion was not vaccinia. Eight were vaccinated after having contracted the disease. So that of the whole number admitted *not one* was, according to the best medical authorities, thoroughly protected; or in other words, there was not a patient stricken by this dread disease that had been vaccinated within the time during which vaccination is believed to thoroughly protect (seven years), and not a death occurred among those that had *ever* been vaccinated even though more than twenty years had elapsed. Two of the five deaths were of the hemorrhagic type of the disease, which is almost necessarily fatal; the remaining three were of the confluent type, which is ever very serious. Sixty were males, and twenty-nine were females. Twenty were under twelve years of age, thirteen between twelve and twenty, and the remaining fifty-six ranged between twenty and forty-six. All of the patients, with the exception of two, were newcomers to our city—having resided here less than a year—which fact speaks in no uncertain manner in favor of the very thorough system of vaccination inaugurated by Dr. Hagan last year and continued during his occupation of the health office.

I feel the importance of bearing with considerable weight upon this subject of protection by vaccination, as seen in fact when this most loathsome malady is met and studied. Theorists are ever ready to rush into print with argument for or against its protective influence, though but few of

them have ever studied it at the bedside, and learned by actual contact the true story, as told by nature. Facts are indisputable, and far more convincing than theories, so I beg leave to cite some that have come to my notice during the past winter; I do so with the more emphasis, for I know that at least two of the deaths were attributable to articles published against the practice early in the season. A Mrs. Mann and a Mrs. Nevils, residing on New High Street, refused to be vaccinated, though all the other residents of the locality (including the little son of Mrs. Mann, and numbering in all thirty) were protected by it. On the twenty-second of February, Mrs. Mann was admitted, and on the twentieth of March Mrs. Nevils became a patient; both were dangerously sick, and only saved by the utmost care and attention, and will be much marked for life; while of all the thirty who were just as much exposed *not one* contracted the disease. The little boy of Mrs. Mann, though he came to the hospital and was continually exposed by mixing with the other patients, escaped without even the slightest attack.

A young man named Heckman was quite intimate with a family by the name of Augustine, when a boy of the family was attacked, though not discovered by the health department until well advanced, having been treated for measles. All the members of the family were at once vaccinated, but Heckman, fearing serious results, secreted himself, and in a few days was taken down with confluent smallpox, and died on the tenth day; while two boys, a girl, and the mother, though contracting the disease, were so protected by the vaccination that all passed through without at any time being dangerously sick; had the protection been received one week sooner, they would probably have escaped entirely.

A little girl named Griniger was admitted March fifteenth, suffering from confluent smallpox. Her three brothers and a sister were immediately vaccinated, but as the disease had (as was afterwards proved) even then made its attack, they were not entirely protected, but though some of them had very grave symptoms at the beginning, the protective influence soon made itself known, and so modified the disease that they all made a rapid and good recovery, while the *unvaccinated* one recovered after a long and painful sickness.

Ada Mills, aged seven, and Tommy Cates, aged three, were vaccinated within a few days of the outbreak, and I do not hesitate to say that they owe the fact that they still live to the fact that they were protected.

It is true that about seventy-five per cent of unvaccinated children die when attacked by variola, while out of eleven received this winter two only died, and *neither of these had ever been vaccinated*. Three of the nurses and myself, though constantly exposed to the contagion in its worst form, escaped entirely, and no doubt owe it to the protection from having been vaccinated. While all the assistants and myself did all in our power to save the lives of those under our care, it would be claiming too much did we credit ourselves entirely with the unusually small death rate, when a great part, and probably the greatest part, was due to the protection from previous though very remote vaccination. I can more than ever feel the great truth, and indorse the remarks of our efficient Health Officer of last year, Dr. Hagan, when he says that this terrible disease would be unknown did every one protect himself by vaccination. I would go further and say that the time should soon come when a person not thus protected should be considered criminally negligent of the lives of the community, and treated accordingly. In a period of twelve years' experience with variola—during which time I have made it a special study—I have never known so small a death rate, and I feel much gratified with the results.

I feel, however, that much is due to the very conscientious assistance rendered me by Mr. and Mrs. Keys and Messrs. Chester and Hickey, who were ever ready by night or day to do what they could to save the lives or alleviate the pains of the many sufferers under our charge. I wish to tender my best thanks to his Honor, the Mayor, for the very solid assistance and encouragement tendered me at all times, and his very kind and thoughtful consideration of both myself and the unfortunate ones under my care, as shown by his daily communications, which were most gratifying to myself and a source of much comfort to the sufferers, who felt that while the executive of the city had such an interest in their welfare nothing needed for their comfort would be denied. I wish, also, to thank the Health Officer, Dr. Reese, for uniform courtesy and consideration, and for his willingness at all times to second any desire and to fill any want for the good of my patients, or for my own comfort—allowing me at all times free exercise of judgment in the treatment and care of the sick. And, finally, I feel that I can say that I have the pleasant knowledge that all the unfortunate ones who have been inmates of the hospital this winter have been satisfied, and all are willing to bear witness that their treatment both by the Board of Health and by the officers of the institution was all that could be desired, and more than was ever expected.

I have the honor to be your obedient servant,

L. S. THOMPSON.

ORIGIN AND PROGRESS OF THE SMALLPOX AT SAN FERNANDO, FEBRUARY AND MARCH, 1888.

There have been two cases of smallpox at San Fernando and one of varioloid. It is impossible to trace the disease to a definite origin. The first patient was a man twenty-four years old. He was taken with the first symptoms while in Los Angeles on February eighth, and the next day returned to San Fernando. He was in Los Angeles only three days. Previous to that time he had not been anywhere near the smallpox for months, but was in daily communication with people from Los Angeles. The disease must, therefore, have been communicated by a third party. At first he was supposed to be suffering from pneumonia; and, owing to the fact that he usually had an acne eruption on his face, the diagnosis of smallpox was not made until February fourteenth. The next day I saw him for the first time. There was a pustular eruption all over the body, and the skin of his face was considerably swollen. Temperature, 103 degrees; pulse, 120. The disease ran an ordinary course without complications, and he was discharged cured on March fifteenth.

The second case of smallpox and the case of varioloid appeared about the same time, February twenty-third. The case of varioloid was the wife of the first patient. She had been vaccinated on February fifteenth, with success. The eruption had entirely disappeared by March fifteenth, and she was discharged with her husband.

The second case of smallpox was a sister of the first patient, nineteen years old, and eight months pregnant. I was called to see her on February twenty-third. She was suffering intense pain in the lower abdominal region, slight pain in the back and hips, and had some headache. Temperature, 102.5 degrees; pulse, 120. In a few hours she gave birth to a child. She had done a hard day's work washing the day before, so it seemed an ordinary case of premature labor. Two days afterwards, March twenty-fifth, the eruption appeared, and the house was immediately quarantined.

With the appearance of the eruption the fever did not subside, but the temperature rose, and for five days varied between 104 degrees and 105 degrees, pulse 120 to 130, during which time she was frequently delirious. The eruption afterwards became confluent, so that her whole face was one mass of pustules. On March fifteenth (the twenty-second day of the disease) she was removed to the house which her brother had vacated the same day. This was for better ventilation, and because the house could be more easily guarded. Her temperature was then 102.5 degrees, pulse 120. The next day her temperature was 100.5 degrees, pulse 80. From that time she improved steadily and was discharged cured on March thirtieth.

MEASURES TAKEN TO PREVENT THE SPREAD OF THE DISEASE.

1. Quarantine and isolation. 2. Vaccination. 3. Disinfection, etc.

1. Quarantine and Isolation.

On February fifteenth, the house was flagged and a guard placed in front of it night and day. On the twenty-fifth of February, the house where the second case appeared was quarantined. It was a hotel and saloon in the same square with the first house. There were sheds and outhouses back of the hotel, so it was necessary to quarantine nearly the whole block. To do this effectively, three day guards and three night guards were necessary. The woman who keeps the hotel is an habitual drinker and unreliable; so the guards were given a shotgun, and instructed to use it if necessary. On March fifteenth, as soon as the patient could be removed, she was carried to the house that had been occupied by her brother (the first patient). A reliable man, who acted as nurse, cook, and guard, accompanied her. Then only one other guard was necessary during the day, and none at night.

2. Vaccination.

Everybody who could be persuaded was vaccinated. On the appearance of the second case, blank forms were printed, and it was given out that vaccination was "compulsory" and free. One hundred and twenty-five people were vaccinated by myself, and a few others procured virus in Los Angeles and were vaccinated without my knowledge. Only a few who had been successfully vaccinated within a year were revaccinated, and none with success. Two families declined to be vaccinated.

[In seventy cases, virus from the Chicago farm was used; in fifty, Alexander's virus, and in five, Rafael (Pacific Coast) virus.]

It has been impossible to ascertain the exact proportion of successes, but it was somewhere between 50 per cent and 75 per cent of all cases. The woman who had varioloid was vaccinated (with success) the day of my arrival. The one who had the severe case of smallpox had not been vaccinated.

3. Disinfection, Etc.

My clothes were changed before and after every visit, hands cleansed with scrub-brush and soap, and face and hands washed in a 5 per cent solution of carbolic acid. As soon as the second case appeared I had a small shanty built, about fifty yards from any other building. It was divided into two compartments, with a separate entrance to each, and a door in the partition between them. In one of the compartments were

kept water, scrub-brush, and soap, and a large jar of 5 per cent solution of carbolic acid; in the other, a suit of clothes, hat, and pair of shoes, which were worn only on visits to smallpox patients.

In the case of the two women, the hair was cut short, so that the head could be thoroughly washed. Every patient had a warm bath daily for several days before being discharged. On the last day a complete change of clothing was placed on the portico outside the house, and the convalescent, after a warm bath, clad in clean clothes, immediately left the premises.

The mattresses (five in number), bedding, and most of the clothing worn by the patients, were burned; all the clothing not burned was boiled for two hours in a 3 per cent solution of sulphate of zinc. A strong solution of copperas was used for dejecta and privies, which were afterwards douched with a one to one thousand solution of bi-chloride of mercury.

The room occupied by the patient in the hotel, and the one adjoining, and all the rooms of the other house, were fumigated with sulphur. Then the floors, ceiling, walls, windows, and bedsteads of every room in both houses were scrubbed with soap and water, and washed with a one to one thousand solution of bi-chloride of mercury. Afterwards all the doors and windows of the hotel were kept open for a week, and instructions given that the other house should be aired in the same way. (I left San Fernando the day after it had been disinfected.)

Respectfully submitted.

WEST HUGHES, M.D.

To H. S. ORME, M.D., President State Board of Health, Los Angeles.

SMALLPOX IN SAN FRANCISCO.

By S. S. HERRICK, M.D.

San Francisco was entirely free of smallpox for a little more than a year, when a case was reported on Jessie Street, February 23, 1887. This was a solitary case and the city continued exempt until May third, when a Chinese passenger from the steamship "City of Sydney" was sent to the Twenty-sixth Street Hospital. It appears that several deaths occurred in the steerage during the voyage from Hongkong, one of which was four days before reaching this port, and was reported by the ship's surgeon as occasioned by purpura hemorrhagica. The case just mentioned as sent to the pesthouse May third, developed eight days after arrival in port, which gives an interval of twelve days from the death of the case of purpura hemorrhagica, and there is strong ground for presuming that the latter was really hemorrhagic smallpox. In any event, it is clear that the present visitation has grown out of infection brought by the "City of Sydney" about the end of April, 1887.

The following is a numerical exhibit of the course of the disease up to the end of June, 1888, derived from the records of the Board of Health:

MONTH.	Total Cases.	Male.	Female.	White.	Mongol.	African.	Deaths.
May, 1887.....	8	8	—	3	5	—	—
June, 1887.....	11	6	5	10	1	—	2
July, 1887.....	9	6	3	9	—	—	3
August, 1887.....	6	6	—	6	—	—	1
September, 1887.....	6	4	2	6	—	—	1
October, 1887.....	6	2	4	5	1	—	2
November, 1887.....	33	20	13	31	2	—	4
December, 1887.....	86	67	19	79	7	—	10
January, 1888.....	224	190	34	183	30	1	27
February, 1888.....	115	84	31	97	18	—	9
March, 1888.....	23	20	3	20	3	—	4
April, 1888.....	22	18	4	16	5	1	4
May, 1888.....	8	5	3	8	—	—	2
June, 1888.....	11	8	3	11	—	—	—
Totals.....	568	444	124	494	72	2	69

The vaccination history of those admitted to the pesthouse was not made a subject of systematic inquiry till January 11, 1888. From this date to June thirtieth, two hundred and forty-seven persons, excluding Chinese and school children, were received, of whom one hundred and eighty had been previously vaccinated, and sixty-seven not vaccinated. During the whole period of fourteen months twenty-nine school children were admitted, three of whom had never been vaccinated. Of these twenty-nine three died.

Justice to the San Francisco Board of Health demands the explanation that repeated efforts were made, beginning in the early course of the visitation, to have enforced the rule requiring all public school pupils to be protected by vaccination. The appearance of smallpox among these children indicated that the rule had been relaxed, and inquiry developed the

fact that it was entirely neglected in some of the suburban districts. It was proposed to make an inspection of arms at the school houses, and to vaccinate there or elsewhere all who needed protection; but opposition was made on the ground that the "Board of Health had no right to use a school house for a health office." It would be unfair to say that the school authorities generally were opposed to the enforcement of the vaccination rule; but it would be a suppression of truth not to state that the Superintendent, Mr. James W. Anderson, and Mr. Thos. P. Woodward, a member of the Board of Education, were conspicuous in obstructing the inspection of the school children, by which means alone the Board of Health could be satisfied of the protection of these children.

In the month of February, Drs. Fred. W. Lux and Kate I. Howard were employed by the Board of Health to visit the public schools for the duty above indicated. Eight schools were visited, and two thousand and seven pupils examined; only four refusing to submit to the inspection. Of this number sixty-seven were found totally without visible evidence of vaccination, making $3\frac{1}{4}$ per cent of those examined. Of the remainder it may be presumed that a large proportion were only partially protected, judging from the twenty-nine pupils who were admitted to the pesthouse, only three of whom were entirely without vaccination marks. At this point the examinations terminated, for the reason above stated.

Nevertheless it is probable that the efforts of the Board of Health have not been fruitless, and that few children are now admitted to school without vaccination certificates; but with the disappearance of smallpox, and in the absence of sanitary supervision of the schools, it may be expected that there will be a relapse to the former neglect. It is now to be observed that very many parents postpone the vaccination of their children till the school age, and, recognizing it as a condition of entrance to school, entirely lose sight of its relation to smallpox.

Free vaccination at the health office is constantly provided for the public, and by the month of July the number of applicants so increased that it became necessary to employ a physician for this special work. Soon after other physicians were employed to visit houses in neighborhoods where cases of smallpox had been discovered, and offer gratuitous vaccination. Gradually the health office became so thronged, that two vaccinators were for some time kept hard at work, which continued on evenings and Sundays. The number of gratuitous vaccinations recorded from June 20, 1887, to June 30, 1888, is more than eighty thousand, at an expense of \$7,526 80 for bovine virus, and \$4,230 paid to physicians. This number includes those performed at the health office, at private houses, and at hotels, lodging-houses, factories, workshops, etc., where vaccination was requested for inmates or employés.

It is desirable to know the results of vaccination, both in the interests of the individual vaccinated and for the purpose of determining the value of the virus used. After long experience in this kind of work, I must acknowledge that my efforts to arrive at accuracy in the results have been far from satisfactory. The chief difficulty grows out of the neglect of persons to return and report. This, I presume, is the experience of most practitioners in our country; and, therefore, I regard with some wonder a report of five thousand two hundred and five vaccinations during this visitation by a certain practitioner, of which four thousand seven hundred and eighty-nine were successful, taken in connection with the following statements: "About one third were primary cases. * * * I do not consider the sore limb with swollen glands and severe constitutional disturbances successful vaccination. Nor do I consider the bloody tumor, nævus, or raspberry excrescence,

the thin, yellow, and irregular crust which falls off in eight to twelve days without leaving a forcatod and striated cicatrix, a successful inoculation. It is only where I found a circular vesicle with depressed center and circumscribed oreola forming in from six to ten days, or an umbilicated striated kine-pock mark, that I passed them and issued a permanent certificate." My own experience in September, 1887, was as follows: Vaccinations performed, one thousand three hundred and thirty-six; reported for verification, four hundred and seventeen. Bovine virus was used from two different establishments; one of which gave one hundred and thirty-five successful results, with fifty-seven failures—all primary vaccinations. The other gave one hundred and sixteen successes and one hundred and nine failures—all primary, also. My record from March 6 to June 30, 1888, gives two hundred and sixteen primary vaccinations; one hundred and thirty-five reported for examination, showing sixty-five successful and seventy failures.

The general results of vaccination by the various physicians employed by the Board of Health were not highly encouraging, and, therefore, the Board was gratified to learn, in January last, that a vaccine farm was in successful operation at San Rafael. Before deciding to use the new product, it was deemed advisable to know something of the management of the establishment, and the present writer was sent on two separate occasions to make an inspection. At the first visit there was opportunity to observe a few calves, a few appliances of the rudest nature, and the inoculation of one animal. It was learned that the virus had been used for a short time, and to a very limited extent, on children at San Rafael, but no record of results had been made. At the next visit the inspector was not allowed to make further observations, in order to guard against any possible rivalry. The inspector was surprised to learn that there could be "trade secrets" in this business when conducted by a member of the medical profession, after observing a vaccine establishment some years ago at New Orleans, which was open to the public without reserve.

None the less, the San Rafael virus was given a fair trial by the Board of Health, but the various public vaccinators reported almost uniform failure, and it was soon abandoned. It is greatly to be regretted that this establishment could not have been brought to a fair pitch of efficiency, as it is the only one upon this coast, and the virus from eastern farms has lately proved more unsatisfactory than ever. In fact, for several months a particular vaccine, which had been highly praised in earlier months, has been found later, in my hands, to give a majority of failures in primary cases.

In the control of smallpox our main reliance is in vaccination. When the disease is absent young children can be vaccinated at convenience and there is little call for secondary vaccinations. In case of failure with children the operation can be repeated in a leisurely way, until successful. But in the face of pestilence sure results are an urgent want—there is no time to repeat uncertain experiments. Especially important is certainty in secondary vaccinations. With a virus liable to fail in 25 to 50 per cent of cases, no one can feel sure of safety as long as failure takes place. Repeated failure may be due to fault of the vaccine rather than protection by previous vaccination, and delay is fraught with danger.

In my judgment it is greatly to be regretted that humanized vaccine has fallen into discredit. Unfortunately there was ground for distrust of this source of supply during a limited period of the past, as there still is upon the Hawaiian Islands, owing to the prevalence there of syphilis. Careful study of the history of vaccinal syphilis in Europe convinces me

that such accidents grow out of culpable carelessness in the selection of vaccinifers, while experiments made with virus taken from children known to be syphilitic were rarely successful, unless there was admixture with their blood. During the late civil war in this country there were numerous occurrences of "spurious vaccination," a portion of which were probably syphilitic in character; others were of the nature of pyemia or septicæmia; while the majority were attributable to the scorbutic condition of the subjects of vaccination. It is certain that the worst results followed vaccinations performed by soldiers on each other, without the slightest care or discrimination in the selection of virus; and it is highly probable that no syphilitic result followed vaccination performed by medical men with vaccine taken from a young child.

Undoubtedly the publication of such accidents has led to greater care in the selection of vaccinifers and prevented, for the last fifteen years, recurrence of vaccinal syphilis. Speaking from personal experience and observation, though previous to 1887 connected mostly with vaccine from human sources, and so far without meeting a case of vaccinal syphilis, my opinion is that danger of this accident is imaginary rather than real, provided due care be taken in selecting lymph from healthy children, never before vaccinated, between the ages of six months and six years, without admixture of blood. With this lymph in primary vaccinations I have not had one failure in more than a year up to the present writing, September twenty-first, nor any irregular results. After failure with the bovine virus, it is my custom to suggest the use of human lymph, and this is often accepted. In primary vaccination, the first trial has been invariably successful.

The lymph used by me is taken from normal vesicles on healthy children seven days after vaccination. Puncture of the vesicle at this stage is followed by the flow of two or three drops of the lymph, which is received on points. Those previously charged with bovine virus are used for this purpose, after washing. As there is almost daily opportunity to renew the supply, the virus is always fresh.

Besides the uncertainty of the bovine virus, there are other features of common occurrences, which are not pleasant and which are not found in the human product. The sores are apt to be quite serious in character; a considerable eruption on the body is liable to take place; and the points of vaccination frequently develop a raspberry-like excrescence (sometimes a true ecchymosis), which may remain for weeks, and is often mistaken by the inexperienced for the normal result of vaccination.

It is claimed that the protection afforded by bovine vaccination is more positive and lasting than that afforded by the Jenerian virus after numerous propagations in human beings. It is true that virus at one or only a few removes from the animal, produces more energetic effects than that obtained after many successive human propagations, and I shall not deny that some deterioration in the protective power of vaccination resulted in the long period which elapsed from the time of Jenner up to the time when animal vaccine began to come in common use in this country. But when it is claimed that the bovine virus gives certain and indelible protection from smallpox, I must dissent. In the April (1888) number of the "Pacific Medical Journal" I gave six instances of smallpox which occurred during the present visitation of the disease in San Francisco after recent and successful vaccination with the bovine virus. But in order to obviate any possible deterioration of humanized vaccine, it is sufficient to recur occasionally to the bovine source of supply.

The conclusion reached by me, after more than twenty years' experience with both kinds of vaccine, is as follows: The danger from human lymph

taken by a careful and experienced vaccinator is imaginary rather than real. The results with this virus are so much more certain and regular, that it should have the preference whenever smallpox is threatened, and always have the preference in secondary vaccinations. It should here be explained that I never use humanized virus without the knowledge and consent of persons old enough to judge for themselves or for those in their care, and that most of my work is done with bovine virus, in deference to popular demand.

On December twenty-ninth the disease had gained such general diffusion over the city, and the cases were so numerous, that the Board of Health felt justified in declaring it epidemic. Subsequent action, declaring the disease no longer epidemic, was taken March sixteenth.

In the early part of January the number of sick at the smallpox hospital exceeded one hundred, and soon after the demand for further accommodations became so pressing that an additional building was hastily erected, so that the capacity was doubled, or equal to the needs of two hundred patients. Before this time the Board had found the monthly fraction of its annual allowance from the city treasury far below its actual wants, and relief was sought and obtained from the Urgent Necessity Fund. The total amount drawn from this fund, expended on account of smallpox solely, was \$40,000, in addition to \$5,000 appropriated for the maintenance of the smallpox hospital. The following were the principal items of expense: Bovine virus, for gratuitous vaccination, \$7,526 80; paid to additional physicians for services in vaccination, and other duties, \$5,673 32; maintenance of smallpox patients, \$20,199 99; cost of a new building, erected in January, as an annex to the pesthouse, \$7,561 37; disinfectants, \$961 60; horse hire, \$1,170 50; paid additional employes, \$4,515 68; total, \$47,609 26. The excess above \$45,000 was made up from the ordinary funds at command of the Board.

To the above amount should be added the value of the lives sacrificed, for every human life has a value as capital for the production of wealth, usually estimated at \$1,000 per capita, and in California this is a low estimate. Here would be \$69,000 more lost.

Besides, the Pacific Mail and the Oriental and Occidental Steamship Companies declare that their extra expenses, due to quarantine, from February 1 to May 1, 1888, were \$75,000 to each company, or \$150,000 to both, in addition to the cost of maintaining Chinese passengers for other periods of ten days, whenever cases of smallpox happened to occur on their ships *in transitu* during the season. It is probable, therefore, that these two companies have suffered damage to the amount of \$200,000 during the period of May 1, 1887, to June 30, 1888. The total loss to the city and to the steamship companies therefore considerably exceeds \$300,000.

Some comments on the foregoing facts may now be appropriate. Theoretically speaking, smallpox is a preventable disease, but not absolutely so in a free country like ours. Its existence is a part of the price of our liberties, but, in the present state of knowledge on the means of prevention, an epidemic of the disease means bad sanitation, and is discreditable to any civilized community. It is a poor excuse to say that San Francisco was not prepared for it. No American city of 300,000 inhabitants, and an assessed value of \$273,000,000, has a right to plead want of preparation to control smallpox. The needed pecuniary means, which are abundant, should be made available *before the enemy has come*; the sanitary knowledge required is the property of the world; suitable persons to put both in operation can be found, if wanted.

The Health Department of San Francisco was organized nearly twenty

years ago, when the population was a little more than one third its present number. During this period it has lost rather than gained strength, for the place of Assistant Health Officer has been abolished. With increasing territory and population the number of Health Inspectors has remained only six. Experience shows that Chinatown and the cheap lodging houses are generally answerable for the introduction of fresh cases of smallpox, and no such sanitary force is adequate to keep them under proper supervision.

The city has a population of nearly three hundred and fifty thousand, and a sanitary force available for outdoor duty of one medical officer and six non-medical inspectors. Systematic inspections are out of question. Nuisances and sickness cannot be sought out and prevented; they can only receive attention when reported by others. As a natural consequence pestilence sooner or later gets the upper hand. This is the event for which no preparation has been made; its cost, the "pound of cure" from neglect of "the ounce of prevention," represented by more than \$100,000, including the value of human lives sacrificed.

The Health Department at all times offers free vaccination to those who visit its office at the New City Hall. Doubtless free vaccination costs less than the expense of a few cases of smallpox, and the preventive measure ought to be made as general as possible. In other words, it is expedient to make it convenient for people to avail themselves of the offer; or, to be more precise, there should be vaccination stations in selected parts of the city's extensive territory. It would be work enough for one medical man to attend six different stations in rotation, for one day in the week at each, besides attendance for the same purpose at the health office every day in the week, including Sundays. The same officer could also inspect the public schools, and prevent a repetition of twenty-nine cases of smallpox among the pupils, with three deaths, according to late experiences. The estimated money value of these three lives would about equal the cost of this service for one year, without counting the cost of maintaining the whole twenty-nine at the pesthouse.

Inasmuch as San Francisco receives occasionally cases of smallpox from the interior country, it is obviously out of the power of sanitation to keep the city constantly free of the disease. As to steamships engaged in the Chinese traffic, it is a different matter. A thorough system of vaccination of the Chinese passengers before sailing would effectually prevent the importation of cases at this port. The effective disinfection of their personal effects after arrival would complete the needed preventive work. But it must be understood that humanized virus is to be used, instead of the commercial bovine article, and it would be the work of a competent medical man to conduct the vaccination of children at Hongkong, so as to provide a sufficient supply when wanted. It is quite within bounds to assert that the two steamship companies might have avoided the repeated introduction of Chinese effects with smallpox during this period, at an expense of \$200,000, by the expenditure of much less than \$10,000, as compensation of a competent sanitarian.

The cost of this visitation of smallpox to San Francisco and to the steamship companies may be regarded as a penalty for violation of sanitary laws; also as the price of a lesson in sanitation. The important question is, whether, in either or both senses, it shall fail of effect in preventing a repetition.

REPORT ON SMALLPOX IN STOCKTON.

By C. A. RUGGLES, M.D., Health Officer.

The first case of smallpox that came to my notice in Stockton was on October 27, 1887—Mr. Geo. H., a clerk, aged twenty-two years. The origin of it I never could satisfactorily ascertain. There were ten other members of the family. The conditions were extremely favorable for perfect isolation. The patient was placed in the upper story of the dwelling. The members of family occupying the lower part of residence were all successfully vaccinated. To the cheerful compliance and hearty coöperation on the part of the family in all quarantine regulations am I much indebted for a successful confining of the disease to that one case. It was of confluent type; was quite severe; but he recovered.

Exemption from the disease lasted but a short time. On January 3, 1888, Miss Nellie G., aged sixteen years, was attacked, and, as in the preceding case, the origin was never ascertained. Her case ran the usual course, and terminated in recovery. Successful isolation was maintained. No other member of the family took the disease.

From this time until May twenty-first there was no period that we did not have one or more cases. In all, there were thirty-one cases—seventeen males, and fourteen females—the oldest, seventy years, the youngest, five months old. There were three fatal cases.

The disease, generally, was of a mild type, a few only being severe. Four of the patients were colored persons, and had it very severely, two of the four terminating fatally, one at the age of seventy years.

A mistake in diagnosis furnished four cases. A mother, believing her son had chickenpox, gave no notice of his illness, thinking herself equal to the task of treating such a slight matter. It did not progress satisfactorily to her and some of her neighbors, and I was called in to verify a case of varioloid in the beginning of the pustular stage. To this case three light and one very severe case were clearly and positively traced, thus confirming the statement that from a very mild case a dangerously severe one may arise.

Seven cases were clearly traced to an importation from Gilroy. One case, in second day of papule, came from that town in cars, from the depot in carriage, and as far as I could ascertain no case arose from it, leaving one to draw the inference that the communicability of the disease is somewhat exaggerated.

As to the time when infection may take place, there is great diversity of opinion. Some authors contend that it may begin even during the period of incubation; some that the period of suppuration is the time of infection; others claim the infecting period is during desiccation, and others say "little is to be feared until the vesicles are fully formed." While I do not now dispute either theory, I do say that after much experience in this disease, extending over many years, I have never seen a case where I had any reason to believe the infection took place during the period of incubation. At the same time I am firmly of the opinion that the last mentioned theory—that infection does not take place until the formation of the vesi-

cle—is dangerous, as I have positive evidence of two cases that became infected on the first or second day of the papule.

It would seem a waste of time and an insult to the intelligence of the reader to discuss the question of vaccination as the only preventive measure that is known to successfully avert smallpox. But how and in what manner it should be used is a matter deserving thoughtful consideration. Of late it has become very fashionable to extol bovine virus on account of its purity, and the impossibility for it to produce sepsis, and to discard humanized virus on account of its impurity and probable blood poisoning qualities. During the last epidemic, and others that preceded it, I saw many bovine virus points discolored, which I discarded, believing it unsafe to use them thus partially charged with blood of the animal and other foreign matter, thus negating, in a certain degree at least, the purity theory.

Experience and observation have shown me that bovine virus will fail to produce the desired effect in about 25 to 30 per cent of cases. I am of the opinion that humanized virus, taken from the arm at the right time, that is, on the eighth day, when in the vesicular stage, entirely free from any accidental bleeding, with nothing but pure lymph, is as equally free from danger as the best of bovine, and is more reliable than bovine, the failures to succeed in primaries not amounting to 5 per cent, and not as furious and severe in its operation and equally protective in its effects. If again, as I have been in the past, situated where I must have sure and reliable results from vaccine, I should use humanized virus.

It is well understood that no two cases are alike, so the treatment must be necessarily different. But the general plan was of a supporting and tonic character. Beginning early with quinine and the most easily digested nutriments, very soon adding whisky or other stimulants, during secondary fever with a high temperature, I gave antipyretic doses of quinine, with good results. I always kept my patients in a dark room, paying due attention to good ventilation. The face was covered with a paste of simple cerate and subnit of bismuth, with the good effect, I believe, to prevent the disfigurement by pitting.

The thirty-one cases were so situated socially that I sent only one to the smallpox hospital. I was able to maintain such perfect isolation by placing guards, flags, and notices, as not to necessitate a proceeding so unpleasant and repulsive to patients and friends, though increasing to a great degree the expense.

The whole expense to the County of San Joaquin and the City of Stockton, and none was spared that was necessary to stamp out the epidemic, was much larger on account of maintaining separate isolated hospitals than it would have been had all or a majority of the cases been sent to the hospital. Including salaries of night and day guards, medical attendance, nurses, funeral expenses, vaccine and vaccinating, the expense was \$2,139.

One case was so uncommon, as in my own experience I had never met one like it, nor had any of my professional brethren here, that I make mention of it. A child two years of age had a very severe attack of confluent variola. It went along quite satisfactorily, with the usual amount of swelling of eyelids and other parts of the face, till one day, when the swelling of the lids had abated, I was able to detect on both corneas a pustule which produced total blindness. With all due respect for our calling, I will say I was glad my patient died from exhaustion on the sixteenth day.

The safety of the community intrusted to us demands the utmost care on our part in the "finale" of a case of variola. A patient is dangerous and capable of much mischief as long as a scab remains on his person, and

he should not be discharged until by the closest examination it is ascertained that he is perfectly free and clean. All clothing used by patients, sheets, pillows, etc., should be burned. We cannot be too destructive. Nothing affords as much security against smallpox germs as fire. In fumigating the apartments occupied by smallpox patients I usually use chlorine gas, or sulphur burned with alcohol. The walls, floors, and other wood work are to be thoroughly washed with chloride of lime and water, and then repainted or varnished, and walls newly papered. It is impossible to be too particular and thorough in this last proceeding.

To make the management of a variolous epidemic a success, we must have the hearty support and coöperation of the municipal authorities, and when a measure to be taken is deemed by the Board of Health or Health Officer to be actually necessary the cost or expense should be of secondary importance.

CHARLES A. RUGGLES, M.D.,
Health Officer of Stockton, Cal.

THE EPIDEMIC OF SMALLPOX IN ST. JAGO DE CUBA IN 1887.

By PHILIP C. HARTMANN, M.D.

St. Jago de Cuba is one of the oldest towns in the West Indies. It is nearly four centuries old. It has no drainage except the surface. Many of its streets are filthy, and but for the heavy rains, that take place at certain seasons of the year, and which make then every street a torrent, things would be still in a worse state; and in regard to hygienic measures nothing has ever been done. The reigning disease is the malarial, and in some years the yellow fever is very fatal to strangers and the unacclimated. This city has a population of forty thousand, of which eleven thousand are white, the rest negroes and mixed races.

In the spring of the year 1887 the city was stricken with an epidemic of smallpox, which, for its severity, will be for a long while remembered. The first case was a military officer, who arrived here in a steamer from Havana and Baracoa. He was landed without ceremony, and lodged for treatment in a house near the center of the city, where he was attended without any more precaution than if it had been a case of intermittent fever. The writer of this article, on the very day of the landing of this individual, went to the Governor and explained to him clearly the dangers that threatened the city, and the calamities that would arise if steps were not immediately taken to have the sick man removed and isolated. This step was the more urgent, as the majority of the people were either not vaccinated, or had not been for a long time. A note was taken of this, and that was all that was done.

Some days later new cases commenced to be reported. One of these was taken to the Centro Benifico, a small hospital sustained by a society for its own benefit. This hospital was situated on a main street, and back of it was an alley inhabited mostly by colored people, with very few vaccinated ones among them. The waters used for washing and bathing this patient were thrown out into this alley, and in a few days there was hardly a house in it that had not some of its inmates down with the disease, and many died.

From this focus it commenced to spread in all directions, causing much alarm among all classes. The attention of the authorities, by the clamor of the press, was at last called to the case, and vaccination committees were appointed to take charge of the different districts and vaccinate all those that were not protected, even had it to be done in a compulsory manner; but so great was the fear of the operation, especially among the negroes (but not limited to them alone, for many of the whites held the same ideas, viz., that vaccination brought on an attack of smallpox in all who attempted it during an epidemic of the disease), that on the approach of the committees the children were carried away or hidden by their mothers and neighbors with the pious object of saving them from the virus of the dreaded vaccinators. Thus very many remained unprotected and they soon fell victims to the scourge by hundreds.

Now, in the portion of the city inhabited by the wealthier and better educated class, there was not a single case, owing to the care that had been taken in regard to timely vaccination.

Never was any attempt made to isolate the sick, nor any other means taken to prevent the spread of the disease. In the month of June, two hundred and six died; July, three hundred and sixty-four; August, two hundred and thirty-four; September, eighty-two; October, twenty; total, nine hundred and six. The number of persons attacked was considerable, many more than was reported (two thousand one hundred and ninety-four), as the physicians, regular and irregular, who attended did not report but a small number of the cases that came to their notice.

P. C. HARTMANN, M.D.

REPORT ON ANIMAL VACCINATION.

By HENRY A. DU BOIS, Ph.B., M.D., of San Rafael, California.

This report resolves itself into two parts. First, a brief consideration of animal vaccination; and second, a statement of what has been so far done at the only vaccine station on the Pacific Coast.*

ANIMAL VACCINATION.

It is now ninety-four years since Edward Jenner vaccinated James Phipps with virus taken from the hands of Sarah Nelmes, and tested the protection thus given the former by inoculation with smallpox virus, without effect. Since this event, an event ever to be remembered in the science of preventive medicine, virus has been taken from children and used for the protection of the inhabitants of every civilized country from the ravages of smallpox. Almost from the date of the discovery doubt was thrown on the protection thus given. Jenner believed that it lasted throughout life, and inoculations thirty years later than the original vaccinations were certainly, in many cases at least, unsuccessful; while if we give credence to the reports of certain public vaccinators, who report 80 to 90 per cent of secondary vaccinations as successful, our opinion must be that the protection given by this operation is limited to a very few years at most. The general opinion of those competent to form an unbiased judgment, from an impartial study of all the facts, seems to be that the protection lasts in some cases for life, but more often diminishes as time goes on, so that it fails to give efficient protection after a certain time, which varies in each individual case. Almost all authorities agree now in advising revaccination; some once, while most consider repetitions of the operation at various ages more prudent, if not absolutely necessary to give full protection. There are, however, some able men who still maintain that the protection given by this operation, if properly performed with virus taken directly from the cow, or only a few removes from its origin, and at once introduced into the system of the recipient, is practically for life in most cases, and found their opinion on the following facts: Jenner's vaccinations, and those of his immediate followers, were generally tested after a longer or shorter time by inoculation, and almost uniformly without success. Since this period statistics show that smallpox in those periodically vaccinated is by no means uncommon, and apparently until a few years ago the percentage of those thus becoming diseased increased steadily. This they explain by the want of proper care in the performance of the operation, and by the use of imperfect virus.

I think any one who will carefully examine the literature of the subject

*NOTE.—This report is made at the request of Dr. Orme, President of the State Board of Health of California. It was first intended to include the full consideration of the nature of virus, as well as the technique of its production, storage, and distribution, but as this plan involved a number of colored plates to make the appearances of the characteristic vesicles intelligible to the reader, which, perhaps, fortunately for him, the State was not willing to pay for, I have reserved most of the material collected relating to this portion of the subject for publication elsewhere; and have aimed here to be as brief as the subject would admit of.

will agree with me when I say that physicians generally for many years after Jenner's discovery knew more about this operation than they do now. That it was not then, with the memories of inoculation still fresh in their minds, considered a trifling one, that could be safely intrusted to any untrained operator. Jenner certainly never wearied in urging that no one should be allowed to vaccinate until he had been first properly trained. Further, I think that humanized virus can be materially improved or impaired by the physical condition of the children, through whose system it is passed, and that on the whole virus generally in use in this country fifteen years ago, before the introduction of bovine virus, showed a great difference in its effects when compared with the action of the latter, this producing vesicles resembling in character those of the classical description given by Jenner. My own opinion is that want of instruction lies at the bottom of this whole matter. The medical student of the present day really knows nothing of vaccination, and the practitioner too, generally, only what he has learned by a not too fruitful experience. I can find no positive evidence that virus must *necessarily* deteriorate by its continued passage through the human system, but there seems the strongest evidence that humanized virus in England and in this country at least, and probably in other countries also, before the introduction of animal virus had a shorter period of incubation, a less typical vesicle, a less defined areola, and caused less constitutional symptoms than in Jenner's lifetime. Certainly in comparing a personal experience of a good many thousand cases vaccinated with humanized lymph from 1861-8 with a more limited number in recent years, in which animal virus has alone been used, the difference has been marked, though one chiefly of degrees.

Statistics in England show a gradual lessening of protection, or else an increased infectiousness in smallpox. Revaccinations seem now required at shorter intervals than for some twenty to thirty years after its first introduction, at least such seems the case so far as a comparison of the effects of subsequent inoculation in early times with the apparent necessity of frequent revaccination in the present. As this test is not available we cannot, of course, ascertain with the same degree of accuracy the protection afforded. As to the frequency of revaccination, there are no statistics to enable us to determine the average period of protection with any approach to accuracy, and any regulations on this subject for the benefit of the public should, of course, be based on the least period of time, not on a general average of time that protection is given. Perhaps vaccination at three to six months after birth, at twelve years, again at twenty to twenty-five, and perhaps after forty, with revaccination at any age before or during an epidemic, would comply with the result of the experience of those who have devoted most thought to this subject.

There seems to be evidence, chiefly from Belgium, to show that by the use of animal virus as great if not greater protection can now be given than was in early times afforded by the virus first introduced by Jenner. It must be remembered that in this country animal vaccination has been largely in use for fifteen or more years. So in any comparison of the activity of these two forms of viruses, due allowance must be made for its influence on the humanized virus of the country at large. We can, in fact, in this country at least, obtain no virus humanized for a length of time to compare the animal virus with. So repeatedly have the profession gone back to the cow, that it is doubtful if a single case of cowpox can now be found in the United States, whose virus has come from Jennerian stock.

What are the advantages and disadvantages of using either virus, and which, on the whole, is preferable? We have already alluded to one

decided advantage—the greater activity of bovine virus, properly propagated and stored, when successfully introduced into the system. By this I do not wish to be understood to mean that as ordinarily used it will “take” in a greater proportion of cases. Very little experience is needed to convince one that this is the exact reverse of the truth. The introduction of a virus from one species into the system of another with a lower body temperature always presents more difficulties than in the introduction of the virus of the same species. What I mean is that *when successfully introduced* its action is more thoroughly constitutional, and the local effects are the exact counterpart of those described as typical by Jenner, and which resisted inoculation many years subsequently. I have here, I believe, presented what to my mind is the chief advantage of animal virus, as well as its chief disadvantage, its thoroughness when inoculated, and the difficulty attending its inoculation.

It may, perhaps, be well to illustrate this briefly. Buist, of Edinburgh, holding an official position as teacher of vaccination to the local Board, says, in a very excellent original work recently published, that four scratches one third of an inch long and three fourths of an inch apart, made with a needle, will, if the virus is taken from a healthy child (along-side), at the seventh day produce four good sized vesicles, causing cicatrices covering, collectively, at least half an inch square, while if the lymph is half an hour old only one or two vesicles will form, and these much smaller in size, and that to secure results equal to those of the fresh virus at least forty-eight scratches, close together, will be found to be necessary. The directions that he gives for the use of all stored virus, humanized and animal, are precise and worthy of note, especially in this State, where the “*vaccine rake*” seems the favorite instrument. The directions are there officially issued, and direct that the arm shall first be well *washed* and *rubbed* until dry and reddened. The vaccine virus is then applied and the scratches made through it with a *new* needle, so as not to draw blood. The virus is rubbed into the scratches with the eye of the needle, which is then thrown away. When primary vaccination fails, he directs the operation to be repeated with arm-to-arm lymph, as he justly says that even apparent failures are proved to exert some constitutional influence, which can only be overcome by a more active material, while in partial failures he recommends a second vaccination a few days later, which even when no vesicles result hastens the formation and increases the size of those resulting from the first vaccination. Another comparison of these two forms of virus shows that convenience may sometimes be in favor of one, and at other times of the other. Thus, with a compulsory vaccination law, strictly enforced, arm-to-arm vaccination is practicable, and can be practiced by a trained corps of vaccinators, thereby avoiding much of the danger incident to the use of humanized virus. In this country, with no such law, and with no special training required of the operators, these advantages do not exist. Arm-to-arm vaccination becomes always a troublesome operation, and often impossible, forcing us to resort to some form of stored virus. Bovine lymph, on the other hand, can always be had. Calves can be selected, and, with a thermometer, the progress of their inoculation can be watched, and only virus from typical vesicles need be taken. The quantity of virus is also under control, a very important matter during an epidemic. These are undoubtedly great advantages, but they are unfortunately nearly all neutralized in this State. The State neither owns, controls, nor exercises supervision over any vaccine station. Health Boards, unfortunately, are political bodies, their members being, as a rule, selected, not for their reputation in preventive medicine, but rather

for their political influence. Virus is supposed to be bought in the open market. The cheapest reliable article is supposed to be secured. By whom and how propagated few Health Boards or physicians ask, and if they received a full reply, are not competent to decide as to whether a virus had been propagated with due care and skill, and there is no official authority to give them this information. Virus is found in the market opposed to virus, until, as Dr. Martin truly says: "In times of great demand (the time above all others when only what is known to be the best should be purchased) certain propagators have found this method" (alluding to his method of propagating virus by numerous small single vesicles) "far too old fashioned and 'unbusiness like' for their views. An animal must be made to yield fifteen thousand to twenty thousand points, or none."

He goes on to say that a full grown cow is selected and large sores are made, which, when inoculated, give rise to compound vesicles which frequently coalesce into one or more large sores, giving out an enormous supply of colorless serum containing few vacciniads, their place being supplied by pus cells and other septic matter, the product of inflammatory action. Such virus readily produces a powerful local action, not, however, the typical vesicle; often causes deep ulceration and resulting fever; is not infrequently accompanied by a general eruption, which can be communicated to others, causing sores difficult to heal, and leaving permanent scars. Virus thus produced is *cheap*. Virus produced from single vesicles, yielding only two hundred to three hundred points to an animal, and requiring to be taken slowly, must always be dear. So long as virus is judged by the *amount* and not by the *kind* of constitutional and local irritation produced, and so long as cheapness is demanded before quality, so long will vaccinations frequently present ulcerations accompanied with high fever. Smallpox may, as in a recent case, be contracted with "a splendid sore" on the arm, and thus the distance between the office of the public vaccinator and the pesthouse may not be far. This subject will receive explanation when we come to a consideration of the vaccine microbe and its spore.

There is yet another comparison to be made; and here everything, I believe, is in favor of the use of properly prepared bovine virus. Certain diseases can be communicated by inoculating blood. Syphilis, leprosy, eczema, erysipelas; repeated experiments have shown, can thus be communicated. Tuberculosis, it is probable, can also be thus transmitted. Whether any of these diseases can be transmitted by the liquor sanguinis contained in the vaccine vesicle, and in which the solid bodies which are proved to transmit the contagion exist, is not certainly known.

Dr. Cory, of St. Thomas Hospital, London, inoculated himself with syphilis, to show that pure vaccine virus contained nothing but virus; but it is by no means certain that, with all the care which he doubtless took, that he did not also inoculate blood. Practically, blood may exist in apparently pure virus. A careful microscopic examination is the only certain method of ascertaining its absence. This, obviously, cannot be made use of every time we vaccinate a child. Therefore, with every precaution we may take, we may inoculate blood; and thereby, if not in the lymph itself, transmit another disease. Statistics fortunately show that this seldom occurs. Some twenty-four cases have been reported in England, and about three hundred on the continent. I have no information of the number that have occurred in this country. Bovine virus is entirely free from this danger. Calves rarely have tuberculosis, veterinarians state, though some varieties of cows, especially after calving, are very subject to it, the proportion, according to Dr. Law, a United States Government Inspector, being as high as one half. If the animal is slaughtered from

whom the virus is taken, and before its issue, as is done by the State in Belgium, this danger is entirely done away with.

To sum up, then, I would say that, in my opinion, bovine virus propagated for *quality* only, by a competent physician, under proper official supervision, while it presents certain objections, yet on the whole is more reliable than humanized virus. It is entirely free from the danger of producing other diseases, and much more convenient than humanized lymphs, especially in this country, for all public vaccinations. Where it fails, the virus used being known to be active, and revaccination a few days later is unsuccessful also, arm-to-arm lymph should undoubtedly be tried. To use animal virus successfully its introduction must be accomplished. A careful examination of fourteen thousand ivory points used during the late prevalence of smallpox in this State showed very considerable quantities of virus remaining on eight thousand—considerably over half, it will be seen, of the whole number—sufficient, even after the points had been washed several times in cold water and bleached by a solution of peroxide of hydrogen, to well coat the points.

To preserve virus, dryness and an even temperature below 60 degrees Fahrenheit are necessary. There is no possible objection to the thorough drying of the virus on the points, provided that the necessary care is taken to remove it all when it is used. This is easily effected by tepid water, or glycerine and water, and allowing the points to remain moist for a few minutes before using. After using it is desirable to rinse the points in water to be sure that the coating is all removed. Dr. Martin directs that the virus shall be mixed with the water on the point by means of another point or a lancet. *Failure to remove the virus is a more frequent cause of want of success with animal virus than all other causes combined.* Warlomont gives an account of using virus that had previously in other hands failed, by moistening it with glycerine and water and allowing it to remain for twenty-four hours under a glass cover in a warm room, when it proved very active. Dr. Salmon, Chief of the United States Bureau of Animal Industry, writes me that in his opinion the best way of preserving animal virus is by its thorough drying on quill or ivory points, and its subsequent protection from changes of temperature. Dr. Winslow Anderson, of San Francisco, one of the public vaccinators, tells me that he uses glycerine and water, and has recently tested some Pacific Coast vaccine and obtained a typical vesicle with a point which had been fifty days in his office. I have used successfully on calves and children virus much older than this—in one case fifty-eight days, in another ninety days, and later one hundred and fifty days—with as good results as to type of vesicles and yield of virus as I have obtained with virus a few days old, and Dr. Martin states that he has successfully used virus dried on ivory points a year old.

Passing over the history of the introduction of animal virus, as well as the technical methods on which its successful propagation depends, which latter, though simple, involves constant attention to minute details, which would be of no interest to the general practitioner, and which, to make them thoroughly understood, would require much space and a number of carefully executed plates, I come to the theoretical portion of this subject; and first, what is vaccine? How does it act on the human body so as to render it insusceptible to the contagion of smallpox? A brief statement of the present state of opinion on these subjects, and a still shorter account of the establishment of the first vaccine station on this coast, will close this report.

THEORY OF VACCINE PROTECTION.

The active agent in vaccine virus can be separated by an earthen filter, and is found to be solid, not fluid—so much experiment seems to prove. This solid is believed to be a vegetable germ, because it has the power of reproduction, which inorganic matter has not. It is believed to be vegetable in its nature, from its close resemblance to yeast, and to certain fungi, and to be an air absorbing spore, and not a full developed microbe. While the microbe is readily cultivated in solid as well as fluid media, the spore or germ is found difficult if not impossible of reproduction outside the body. It is readily developed, however, into the mature microbe, or its development can apparently be stopped at certain stages; each of these stages seems to produce a characteristic coloration when the cultivation is made in a solid media, as in gelatine or agar-agar. These colors, so far as observed, are white, yellow, orange, and brown. The action of all of these colored cultivations, when inoculated into the system, differs greatly from that produced by the fresh virus transferred at once from arm to arm. They seem also to differ in some respects one from the other, though so far the exact differences have not been fully studied. Thus there are found a colorless virus, taken early (before the eighth day) from the vesicle; a cloudy or white virus, taken after the areola forms, and which is also produced by artificial cultivation; and the yellow, orange, and brown viruses, produced by cultivation outside the body.

It may be asked how does this spore or germ of a microbe produce a disease in man, and is the disease produced smallpox, softened and modified in its action, but essentially smallpox still, or is it a new disease which produces such changes in the human system as to unfit it to receive the germ of variola. Briefly we may say that this spore entering the system in "true vaccine," develops into the microbe by absorbing free oxygen from the cells of which the body is made up. This oxygen the cells part with, but only after a certain resistance, so that if the spores are only few in number and of feeble vitality, few succeed in developing into microbes. Most of them are starved and die. Two things happen, however, with those that live. These take oxygen from the cells for their own growth, and in doing so give out a specific toxic alkaloid or ptomaine, which in its turn, so to speak, stupefies the cells, so that they give up their oxygen with less resistance. This mutual action goes on until no more of this poisonous alkaloid is formed by the germ, because it can obtain no more free oxygen from the cells. The cells unpoisoned retain their oxygen, while without it the spore remains a spore, and does not develop into a microbe. How this ptomaine causes the cells to give up their oxygen is so far unknown. Its action seems to be upon the bioplasm—the living jelly of which all animal and vegetable life is built up.

Such is the theory advanced by Dr. Salmon, of Washington, to explain contagious diseases produced by air absorbing microbes. If true, it must be able to explain incubation, or the latency of a virus—the protection given for a longer or shorter period—together with succeeding susceptibility, as well as to account for the enormous increase of the virus in the body, and for the identity of each contagious disease. If it does all this, it must do still more, to entitle it to our belief. When we cultivate the germ outside the body in a suitable medium supplying it with oxygen, if this theory is true, it should produce a soluble alkaloid or ptomaine. If it does this, such specific ptomaine, being soluble, can be separated from the germs which produce it; and, if isolated and injected into the body, should produce such a change in the cells as is produced when it is formed within

the body by the germs themselves. Dr. Salmon claims to have cultivated the germs of hog cholera in a fluid medium to full development, and then by a certain degree of heat to have destroyed all microbes; and yet by injection of this fluid in pigeons—very insusceptible to this particular contagion—to have produced this disease. In other words, to have produced hog cholera by a soluble chemical alkaloid or ptomaine, which had previously been produced by the artificial culture of the germ of this disease outside of the body. The effect of the action of the ptomaines of various pathogenic microbes are more or less lasting on the cells, and while under their influence they are not susceptible to the particular disease, for the reason that no more spores can obtain the necessary oxygen from them to enable them to develop into microbes, and hence no more ptomaine is produced. This is, however, thought to be true only of moderate doses. Large doses seem to be able still to poison the cells and to take more oxygen from them. The cells apparently become accustomed to the action of the ptomaine, and this tolerance can be increased by successive inoculations of increasing strength, while the cells will be affected if the dose of the ptomaine is increased too rapidly. *The tolerance of the cells for the particular poison is, therefore, the cause of subsequent protection.*

A period of protection is thus accounted for, of longer or shorter duration, according to the nature of the specific microbe, as well as to the size of the dose and the thoroughness of its introduction into the system. When spores are introduced into the body, a certain time elapses before they have developed sufficiently to have poisoned the cells by their resulting ptomaine, and to take their oxygen. This period is that of incubation, while it is followed by that of the development of the symptoms of the disease. A period of fermentation thus exists, in which a poisonous alkaloid is formed, the amount of which is limited by the amount of oxygen taken from the cells, *and the process of nature to excrete this substance from the system and to repair its effects we call the disease.*

If I understand Dr. Salmon correctly, during the time from the introduction of the virus to the development of the symptoms of the disease, the spores are developing, taking oxygen and giving out their ptomaine and propagating spores. After a certain number of cells have become affected we have external manifestations of the disease. Until this period arrives the germ is said to be incubating. The period of latency is, therefore, apparent, rather than real, and only indicates that sufficient poison has not yet been formed by the microbes to cause external symptoms.

Dr. Salmon's discovery claims that the inoculation of the product of the artificial development of the germ, *after* the subsequent destruction by heat of the microbes, enables him to protect the system of an animal from the disease, and that the action of the ptomaines is milder than that of the germs themselves, as the dose can be regulated. His experiments have so far been made with pigeons, with the microbe of hog cholera, and seem conclusive as to the protection given by a number of hypodermic injections of the ptomaine solution, but he does not, so far as I can ascertain, tell us if the discharges of these pigeons were capable of communicating the disease. Unless the specific ptomaine is capable of influencing unspecific germs to take on a pathogenic action, it does not seem possible that the poison of the disease can be increased in quantity. If the pigeons give out more of the ptomaine than was introduced into their bodies, unless we assume that it acts on innocent germs in such a manner as to make them pathogenic also, the theory falls to the ground, even though protection be given by the action of the ptomaine injections.

This theory is yet new; it seems to me of exceeding promise, but before

it is fully accepted as an explanation of the phenomena, more extended experiments will have to be made. All that can be said of it at present is that it includes what seems proved to be true in the exhaustive theory of Pasteur, as well as in the ptomaine theory of Chauveau. As a valuable working hypothesis I give it, which may at no distant day become a firmly established theory, which will give us a deeper insight into contagion, together with all that that implies, viz., scientific methods of destroying the microbes in many, perhaps all, the diseases produced by specific microbic fermentation.

It would take too much space to recall the varied experiments made by Buist, Quist, and others, by which they have succeeded in propagating the microbes (and even the spores, it is claimed by the latter) of vaccinia and variola, and have thereby, to a certain extent, confirmed the earlier experiments of Ceely and Badcock, as to the identity of the viruses of these diseases, not only so far as the microscope can do so, but also so far as their cultivation in artificial media, fluid and solid, is concerned.

IDENTITY OF VIRUS OF SMALLPOX AND VACCINIA.

Robert Ceely thought that he had proved that he could inoculate a cow with smallpox, and produce a disease with a local vesicle, from which he could obtain virus; with this he tells us subsequently two thousand children were vaccinated without causing contagion in others. Chauveau and the Lyons Commission admit that he inoculated cows with the smallpox, but claim that the two thousand children were simply inoculated, and not vaccinated, and that the disease in them was contagious. It is a question of evidence: which is correct. Ceely is confirmed by Badcock's numerous experiments, and Chauveau is supported by Fleming, who, however, has no original experiments to offer, and is opposed in his conclusions by Professor Simmons, an equally reliable authority in veterinary matters. The Lyons Commission seems not to have been acquainted accurately with the English researches on this subject, and make many statements at direct variance with them on very slight proof. Ceely and Badcock found it *very difficult* to inoculate the cow; only about one out of thirty animals took. They obtained a well defined local vesicle, but no general eruption. Cows so inoculated failed to give the disease to others stalled with them. Badcock's experiments were made on over three hundred cows; Ceely's on a less number, but were carefully recorded and illustrated by colored plates from paintings taken on the spot. Badcock's virus has been used on over forty thousand persons, and Ceely's on a very large number, and both, after forty years, are still in use in England.

The French experimenters claim to have succeeded in *every* animal that they operated on, viz., twelve cows and three horses. The disease that they produced consisted in small vesicles scattered under the hair of the body around the seat of inoculation, and in their first five cases escaped recognition until subsequent experiments had taught them what to look for. They seem to have got no well marked vesicle at the point of inoculation, but rather an ill defined sore with small vesicles around it. With *matter* taken from this *sore* by scraping, they inoculated a number of children and produced a general eruption, which was contagious, and which caused the death of a child with the symptoms of confluent smallpox.

Can we throw any light on this great difference in reported facts? We think recent researches help to explain, to some extent, this matter. First we may say that positive facts, from carefully conducted experiments on a sufficiently large number of animals, by competent experimenters, cannot

be overthrown by simply negative evidence on a much smaller number. The disease observed by the French experimenters did not resemble in any respect the disease described by Ceely and Badcock, as well as by several continental experimenters, either in appearance, period of incubation, or in the nature of the virus produced. It may be remarked that the descriptions of Ceely are almost classical in clearness, while the account of the experiments reported by Chauveau are unsatisfactory on many important points. English authors claim, with some show of reason, that smallpox matter, in an advanced stage, was placed in cuts and caused sores, but failed to affect the system of the cow. Simmons states that he and Marson made many experiments, and failed in producing smallpox in the cow; he, therefore, does not believe that the French Commission could have so uniformly succeeded, as they claim to have done; and he denies that they produced the smallpox at all in the cows that they experimented on, but claims that they simply introduced the virus into cuts, and caused a local irritation, and subsequently removed and used this matter to inoculate children. That they blundered, and that fatally; that the general eruption observed was either caused by irritation, or was of the nature of eczema; and that the short period of incubation would favor this explanation.

BUIST'S RESEARCHES.

Buist has shown that spores of vaccine and variola microbes measure but 0.15μ (micromillimeters), while the microbes are much larger, as seen in cultivations of the clear lymph in the form of white, yellow, orange, or brown vaccine, or in the cloudy virus in the mature vesicle. When he vaccinated a monkey with the clear virus containing the spores alone, he produced a local vesicle, well defined, with slight constitutional disturbance; but when he used the developed forms of the microbe, as found in the colored vaccines, he got secondary vesicles also on other parts of the body.

Jenner believed that in vaccination he produced smallpox, but that the disease, owing to the previous passage of the virus through the cow's system, had lost its virulence and contagiousness. This change Pasteur calls attenuation of the virus. Buist says that perfectly fresh, transparent virus contains spores alone, whether vaccine or variolous, and that opaque lymph is only a natural cultivation of the spores into microbes, and that while the clear lymph is alkaline, the cloudy is acid, and that the action of these two lymphs is very different—the clear, as we have already said, acting with little local or constitutional irritation, while the cloudy causes ulceration and secondary vesicles.

He believes the spores are able to reproduce themselves by bursting, while the microbe multiplies by division as well. When the spores are inoculated they remain for a time at the place of introduction without causing irritation, and are gradually taken up by the lymphatics probably, and in them it may be the greater number of spores become developed into microbes and affect the system. The beginning of local irritation he believes indicates the development of microbes on the skin and their propagation of spores, which in their subsequent development effects rapid changes in the tissues by the withdrawal of something from them, by imparting something to them, and thus altering their actions. He failed to propagate spores in solid media, though he gives credit to Quist for having succeeded in Koch's culture fluid. He believes that instead of trying to improve our stock of virus by energizing that already in use, we should rather endeavor to mitigate by artificial culture variolous virus, using only

virus taken in the papular stage of the disease, before clouding has occurred. Both diseases he believes true fermentations. All fermentations he considers due to the development of spores into microbes, and to their propagation causing certain chemical changes, as the decomposition of sugar into alcohol and carbonic acid, which goes on until the sugar is used up, but may be started by a fresh supply; therefore, the microbes apparently are still alive, though dormant for a time. He finds that by inoculating dried yeast he can produce, after a certain time, a local sore, and he finds the yeast spore in the blood. In the monkey, vaccination did not fully protect it from smallpox inoculation, but after the additional yeast inoculation the protection was complete. By itself it modified the disease, though it did not prevent the entire formation of vesicles.

To return then to Ceely's experiments. He states that he used only perfectly limpid lymph in his inoculations of cows; Chauveau used the cloudy virus. It does not seem to me disproved by any experiment that has been recorded that cows cannot be so inoculated by smallpox virus as to have an eruption entirely different from the typical local vesicle obtained by Ceely. Indeed Buist's experiments would go to show that certain kinds of variola virus might produce a more general eruption than obtained by Ceely, Badcock, and others. If virus, at a late stage, containing microbes, not spores, be used, we should look for a general eruption. In the monkey neither the primary nor secondary vesicles caused the disease in other animals in the same cage. He does not, however, account for the well marked contagiousness of variolous inoculations in man, even when made with the virus taken perfectly clear from papules. He evidently believes that the cow's system attenuates the virus, and suggests its attenuation outside the body by suitable methods, as dilution (Salmon), or prolonged exposure to air (Pasteur). He, however, records no experiments on man; and, while his researches go to show how the Lyons Commission may have obtained a general eruption, they do not (as their object was different) prove conclusively the identity of the two viruses, though they tend to confirm what I at least consider as fully proved by evidence, the creditability of which I cannot doubt, and which has been so ably presented by Robert Ceely, viz., that cowpox is, in the cow as in man, only a modified smallpox, and that Jenner was perfectly accurate in speaking of the *vaccinæ variolæ*—the cow smallpox—and it is to be noted he refused to use any other name, apparently thinking that it might encourage the idea that vaccinia is an independent disease.

GENERAL CONCLUSIONS.

1. Vaccination is the artificial growth of a ferment on the skin, the products of which are absorbed and grow in the blood until the whole of the blood is affected, after which it is impossible, for a time at least, to repeat the process in the same person, who is then said to be protected. (Buist.)

2. The cause of this fermentation is due to the development of a microbe closely allied in all probability to yeast. This microbe is found in various stages of growth—as a spore, when the virus both in and out of the body is alkaline; in more mature forms, as found in the white or cloudy virus, seen after the areola forms or in old stored virus, and also in cultivations in solid media when the reaction is acid. We find varied forms or stages of growth of the microbe, which are indicated by characteristic colors, and which are able to reproduce themselves. These are, as named from their color, white, yellow, orange, and brown.

3. This microbe inoculated as a spore multiplies on the skin and in the

interior of the body, and develops into more mature forms. In doing this it takes free oxygen from the cells, and without it, it cannot develop. The interior of the body has been proved to contain little oxygen in the free state and the protoplasm of the cells to require but a scant supply. If the spores are more active than the cells, they absorb oxygen and excrete a ptomaine which paralyzes, so to speak, the functions of the cells. A ptomaine has been produced in the case of hog cholera outside of the body by the culture of the specific microbe in a suitable medium and its subsequent destruction by heat. Such a solution produces the disease when injected under the skin. The spores exhausting the oxygen of the cells in their development are rendered dormant or destroyed, and this terminates the disease. (Salmon.)

4. The microbe of smallpox and vaccinia are the same. This is proved by the inoculations of cows by Ceely and Badcock, and their conclusions are not in my opinion disproved by the experiments of Chauveau, and the arguments of Fleming and others. Though the microbe is the same in these two diseases, it is rendered probable by the experiments of Buist that their stage of growth is different. It will be remembered that he made cultivations from different vaccine vesicles and obtained four if not five kinds of virus characterized by their colors, viz., white, yellow, orange, and brown, besides the opaque found in the late vesicles. He also found that any one of the first four would produce a general eruption but no local vesicle, but if all four were inoculated a vesicle was also formed. He obtained similar colored viruses from variola. A single cultivation of the clear variola virus, taken early from papules, caused a modified action, as shown when inoculated on a monkey, while a second cultivation rendered its action still lighter and the monkeys both failed to give the disease by infection.

5. The only suitable material for vaccination is that containing spores alone, and not other developmental stages of growth of the microbe. Spores produce a typical vesicle, and no general eruption. Microbes in all their other stages cause great local irritation and often a general eruption. To this cause, doubtless, may be attributed the not uncommon eruptions that were found to follow vaccination with certain animal viruses during the recent prevalence of smallpox in this State.

6. All authorities are agreed that arm-to-arm or calf-to-arm vaccination is that most certain to produce typical vesicles in the greatest proportion of cases, and without undue local irritation or general eruption. Of all stored lymph, that preserved by drying *thoroughly* and *quickly* keeps best and preserves the spores in the spore state, but it requires special skill in using to remove the virus from the points, and to introduce it into the skin.

RULES FOR THE USE OF ANIMAL VIRUS.

The following rules are the result of the most recent research, and may, perhaps, be found convenient to the reader:

1. Only vaccinate those free from fever or skin eruptions, except when absolutely necessary.

2. Cleanse the arm with soap and water and rub until red.

3. Moisten the point in lukewarm water or glycerine and water, and mix the virus on it with the moisture with another point.

4. Apply the virus to the part to be vaccinated, and scratch the skin through it with the point or with a needle, or abrade the skin first with the sharp sides of the point, and then apply the virus. In either case, it is better to make two vaccinations at a distance of an inch and a half from

each other, and each at least one quarter of an inch square. The virus must be rubbed in well. *Whatever instrument is used it should never be used for another case.*

5. See that the vesicle is not injured. Apply, if necessary, jewelers' cotton and a bandage over it, if there is any danger of exposure to infection, dust, or cold.

6. See cases in one week; give only provisional certificates until results are known with certainty.

7. Keep animal virus dry and cool. The temperature should be steady and not over 60 degrees. This may generally be done by wrapping in gutta percha tissue, and putting in a wide-mouthed jar, in which is a small uncorked wide-mouthed bottle containing unslacked lime, closing securely the jar and keeping it in the cellar. Virus will often become inactive in a few hours if exposed to moisture together with sudden changes of temperature.

8. Virus apparently inactive will often become active if wet with glycerine and water, and the virus well mixed with it and allowed to stand under cover for several hours in a warm room before using.

9. Examine all points after using by pouring water over them to see that the virus is all removed.

10. Lastly, take plenty of time, use enough virus, and be sure that it is well rubbed in, and the scarification dry before you dismiss the patient.

NOTE.—Animal virus that produces in any considerable proportion of cases local ulcerations, much fever, and secondary eruptions, if free from septic material, is a virus containing the mature forms of the microbe, and not the spores alone. It is usually propagated by large abrasions in adult animals, which give an enormous yield of liquor sanguinis, with microbes in different stages of development in it, and frequently pus and the results of inflammatory action also. It is very active locally and constitutionally, but is not a pure virus. It is responsible for many of the accidents that sometimes attend this operation. All authorities are agreed that pure animal virus, *i. e.*, virus containing spores alone, acts with little irritation, and that its course is slower than long humanized virus. Virus is never to be judged by the violence of its action, either locally or constitutionally, but rather by its action conforming to a Jennerian type.

WORKS REFERRED TO IN THIS ARTICLE OR CONSULTED.

JENNER, EDWARD—"An Inquiry into the Causes and Effects of the Variolæ Vaccinæ." American edition 1802, from second London edition, with four plates. Still the ablest presentation of the subject, and deserves to be reprinted in this country, and to be once again studied by all interested in preventive medicine.

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CEELY, ROBERT—"Observations on the Variolæ Vaccinæ" and "Further Observations, etc.," contained in volumes viii and x of the Transactions of the Provincial Medical and Surgical Association, 1840 and 1842; also a letter in London "Lancet," February 7, 1880. A model investigation of the identity of smallpox virus with that of vaccine. Experiments conducted with great care and recorded with the most minute accuracy and every appearance obtained, illustrated by most admirable colored plates, amounting to nearly one hundred separate illustrations.

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FIRST ANNUAL REPORT OF THE PACIFIC COAST VACCINE STATION.

This vaccine station was begun November 1, 1887, under the following circumstances: Having in my practice in California since 1869 experienced much difficulty in procuring animal virus that was both active and unirritating, I was led, as early as 1876, to make experimental inoculations of calves, and used the virus thus obtained in my practice with success. At this time I did not go further. A few years ago I vaccinated one of my children with animal virus obtained from a prominent druggist in San Francisco. This produced a large vesicle as early, I think, as the sixth day, followed by an extensive areola later. The vesicle, which was irregular in shape, ruptured, and a deep ulceration followed, extending to a depth of over half an inch and some two inches in diameter. The areola merged into a diffuse erythema, extending over the whole arm and forearm, and was accompanied by vomiting and high fever. The child was seriously sick for some two weeks, and the course of the disease was such as to make it a matter of doubt if she was protected. Subsequent vaccination showed that she was not fully protected.

Having since then had several similar cases with virus that I had supposed to be reliable, and having failed in over two thirds of primary cases in producing any effect with virus procured direct from reliable propagators in the East, by mail, my attention was directed to its local production. But upon making inquiries of the wholesale druggists in San Francisco I found the demand was irregular and limited, and the competition between various eastern viruses so great that there was little likelihood of obtaining sufficient from its sale to pay the necessary expenses of its propagation, without it was used largely by the various Health Boards of the State, as well as by the Quarantine Officer of San Francisco.

Here the matter again rested for some two years, when my attention was again called to this subject by inactive virus on one hand and by the results following the use of irritating virus on the other. Between these dates I had devoted more or less attention to this subject. I finally made up my mind to try the experiment of propagating virus in California, having exceptional facilities for obtaining healthy calves of a proper age and in caring for them economically, thus producing the virus at the least possible cost. I accordingly made a series of experiments on calves and cows with a number of eastern viruses, corresponded with several experts on the technique of its production, and obtained careful reports of the methods followed by the most reliable establishments, from physicians, who, at my expense, visited them so far as they were open to inspection. I also obtained minute directions from the veterinary surgeon employed by the New York Health Board for examining calves previous to vaccination. After repeatedly testing various viruses on calves, and the resulting virus on children, I selected the viruses propagated by Dr. F. G. Foster and by the New York Health Board as "stock."

About this time, and before the necessary buildings were completed, a sudden demand was made upon us for a large supply of virus, owing to

the rapid increase of smallpox in the State. Having only some five thousand uncharged ivory points on hand, and the demand being urgent, Mr. James G. Sheppard, pharmacist, of San Rafael, and who had kindly offered to take charge of the business of packing and dispensing the virus, agreed to recoat used points for the San Francisco Board of Health, supplying one thousand a day, by special messenger, on the same day that the virus was taken, and, of course, without any testing of the virus on children (before issuing), at 6 cents a point—this being the exact cost of production, without any charge being made for the use of the "plant," or for the services of Mr. Sheppard and myself. The Board, Mr. Sheppard understood, promised a fair trial of these points in primary cases, and they were so packed that we could at once tell, by a number, from which calf any virus had come. Samples were also sent to physicians, requesting trial and reports, and a large number sold to physicians, druggists, and others.

The tests we made (subsequent to its issue) with this virus on children, as well as on calves, showed a good proportion of well developed vesicles, without any undue local or constitutional irritation, but there were a number of cases of raspberry excrescence, an irregularity very common in New York at the time our "stock viruses" were sent us, and which Dr. F. G. Foster states was peculiar to no one virus there. Revaccination showed that when accompanied by a well defined areola, that these protected, otherwise not. On this account, we substituted the Martin virus for one of the above, and since have not observed a single case of this irregularity in any subsequent testing. This virus was, after taking, dried over sulphuric acid (free from chlorine and nitric acid) before issuing. The coating was nearly colorless, and was very dry and hard.

The reports received as to the action of this virus have not been numerous, and indicate that in the hands of some physicians it produced a high percentage of typical vesicles, while in the hands of others it failed in every case, and this frequently with virus from the same calf. No report has been received by us from the Health Board of San Francisco. Statements have, however, been made in the daily papers that out of three hundred points all had failed. Dr. Anderson, one of their vaccinators, informed me that he had reported three hundred and nine successes out of four hundred points issued to him for the purpose of testing the virus, in primary and secondary cases.

The object we had in view in furnishing the virus to this Board at the actual cost of production, without asking anything for our own labor, was, of course, that it might be carefully tested. We received a request after the last delivery for the bill for the virus furnished, and a few days later an official communication that payment was refused, as the virus was unsatisfactory. Dr. Herrick has since published the reports of four vaccinators with it, and Dr. DeWitt, another vaccinator, personally informed me that he had used one hundred points issued to him in vaccinating a school, but as they had been mixed with those of another propagator, he could not say whether they had taken or not. Dr. Osborne, of the Home for Feeble-Minded Children, Dr. Durant, of the State Prison at San Quentin, besides a number of private physicians, have reported gratifying success.

We cannot help thinking that the San Francisco Board of Health obtained our virus under a misrepresentation, and that they failed to test it in primary cases as promised. Since this unfortunate experience we have issued virus dried more slowly, and coated to keep it from the air, and have had few complaints of its action, but we do not regard it as as well adapted for keeping as that at first issued, which we still use to send to a

distance. To obtain energetic local and constitutional action (which we do not consider desirable) with either virus, all that is necessary is that the points shall be exposed to moisture and a heat of 90 degrees Fahrenheit for a few hours, when a sufficient number of microbes will develop from the spores to produce sufficient irritation to satisfy even this Board of its activity. This, however, is the exact object that every conscientious propagator uses every measure to avoid.

From the above it will be seen that we attribute the failures that have occurred in the use of this virus to the dryness of the coating of virus on the ivory points, and the consequent difficulty in its removal. That this difficulty was experienced though not apparently recognized with other viruses is plain, at least so far as the San Francisco Health Board is concerned, from the fact that out of fourteen thousand used points furnished us for recoating, about eight thousand had a decided coating on still, even after three washings and bleaching.

If our object had been simply to manufacture virus that would produce sore arms and fever, which the public prints of San Francisco stated—apparently by authority—were the signs following the proper taking of vaccine virus, we should undoubtedly have had fewer complaints and larger receipts from sales.

As our object was to propagate *spore virus* free from microbes as well as blood and all septic matter—"pure spore virus"—we must be content to wait until the knowledge on this subject has increased with the profession as well as with the public, before we can expect to be remunerated for our expenditure. Meanwhile, it is evidently a proper business precaution, and one necessitated by our past experience, to only issue virus already paid for.

One other observation, and I have done with this unpleasant portion of my report. Careful testing subsequent to issue of the virus first propagated showed that the virus of two, if not more, calves failed to take, and unfortunately for us, much of this had been sent out as samples. We therefore issued a circular, and refunded all money paid for this virus or replaced it by fresh stock. We were sorry, however, to receive a demand from a physician connected with a public institution for the refunding of money for virus never bought of us.

What have we done so far? We have secured some forty acres of pasture; have put up proper stables and operating rooms; have vaccinated one hundred and three calves and cows; and have coated twenty-five thousand points. We have spent \$2,500 and only received about \$1,500 for virus sold. If suit against the San Francisco Board of Health results in our favor, this will be increased by nearly \$300. The average number of points taken from a calf has been about two hundred and fifty to three hundred, and the cost to us of each point has been 6 cents, without including any compensation for our services. We have made diligent search for cases of cowpox throughout the State, and have investigated six cases; have distributed one thousand two hundred descriptions of the disease, offering a reward of \$25 for cases. So far, all have proved to be cases of "whitepox," but we are still continuing our inquiries, and hope in time to succeed. We have collected a small library, containing some rare books on vaccination. It would be impossible to make intelligible, without numerous colored plates, the technical methods employed, even if space would permit. We may say in brief, however, that we prefer calves about a year old, in good health, but not fat. That the temperature of these should be taken in the rectum, and should not show changes during the day. This temperature seems higher here than in the East, frequently being 101.5 degrees, and even higher in calves healthy in all respects. If there is no increase of temperature at night, and the animal

is free from diarrhoea and glandular swellings, I believe it safe to disregard the temperature if lower than 102 degrees, Fahrenheit, if it is uniform. The calf, which before using is best kept at pasture, is, after vaccination, put in a clean stall, bedded with fresh straw twice daily. It should have a pail of water to drink from, and should be fed with a good quality of hay, with two small feeds of bran with a little oil cake. Its temperature should be marked on its tag daily, and it should wear around its neck a light collar of wooden slats, to prevent it licking its abdomen. The method of inoculation that we prefer is by single incisions, producing simple vesicles. This plan is used by Warlomont, in the Belgium Vaccine Institute, with great success. Abrasions on the abdomen made by a blunt instrument is the plan used by Foster, while Pardoe, of the New York Health Board, uses a six-bladed lancet, and makes larger scarifications on the flanks and sides of adult animals. There is another method only in use by "the trade." I believe, it consists, like the last, in scarifications on the flanks of adult animals, but differs from it in the size and number of these and in the operators being uneducated. It is of this that Martin speaks in the quotation already given. These yield an enormous amount of serum, and it is said as high as twenty thousand to twenty-five thousand points have been coated from one animal.

An appreciation of these several methods leads us to the following conclusions, which further experience may perhaps modify. The method of small single incisions, which we use, is troublesome and yields a limited supply of very thick virus, which frequently requires much skill and a peculiar technique to remove free of blood. On the other hand, it produces on the calf operated on, typical vesicles, and the virus contains spores only. In my hands it has yielded from fifty to five hundred points—the average being, I think, about three hundred. It is in use in this country by Dr. Martin, whose father was the first to propagate animal virus in the United States.

By the second method a compound vesicle, or series of vesicles, under a crust, are formed, not so easy of recognition as in the former method. The yield of serum is larger, however. In the third method the yield is still greater, one thousand to three thousand points, but the vesicles are by no means well formed, and virus thus taken should always be tested on children before being issued. It cannot compare with either of the other methods, except as to yield. In skillful hands it is capable of furnishing spore virus, but there is constant danger of the virus containing microbes. The commercial method, which is simply this exaggerated, furnishes most of the irritating virus in use in the West. Its only recommendation is the cheapness of its product. A large profit can be made by selling points thus produced on Texas cattle, at one half of a cent each; accordingly large discounts can be given, and a division of profits can be made with those in public positions, and yet enough remain to make the propagation very profitable. Virus produced by the method used by us cannot, I think, be produced much under 6 cents a point, allowing only for actual cost. It therefore cannot compete, as far as price is concerned, with that produced by any of the other methods.

The objections to all virus taken from large scarifications is that the vesicles are not well defined. The flow of serum is large, but the exact stage of growth of the spore cannot be ascertained readily. Consequently virus containing microbes, and consequently producing irritating constitutional as well as local effects, will often be issued. With regard to the activity and keeping qualities of our virus, Dr. Winslow Anderson writes me that he has obtained a "beautiful vesicle" from a point fifty days old,

kept most of the time in his office. I have also obtained typical vesicles in virus fifty-eight, ninety, and one hundred and fifty days old.

In concluding this report, I would ask if it is desirable that a vaccine station should exist on this coast, and if so if it shall supply the very best virus without regard to cost, or the best virus "for the money." There is only one way to give confidence to the public in the first named or germ virus and at the same time to be certain that it only is issued. In my opinion the vaccine station should be owned by the State, or else under its supervision. If in private hands its product should be tested and its processes inspected. In return its virus should alone be used by the State, who should have a direct interest in its success. So far, as we have already said, we have made virus that is active, keeps well as far as tested, and produces little local or constitutional irritation, but in doing this we have lost \$1,000 on twenty-five thousand points sold. As this is about the cost of our "plant," which we still have on hand, it perhaps should not be all charged as lost. Against this, however, several months' constant attention of Mr. Sheppard and myself is to be charged, as every point has been taken and packed under the immediate supervision of one or the other of us.

VITAL STATISTICS, AND THE TRUE COEFFICIENT OF MORTALITY, ILLUSTRATED BY CANCER.

By JOHN LE CONTE.

Mankind, when studied in numbers sufficiently large to eliminate accidental and individual peculiarities, possess certain *common qualities or properties*, which vary according to *determinable laws*. For example, the ratio of the sexes at birth, their relative weight at the same epoch, their gradual growth until the period of maturity, their attainment of a certain mean age, and their liability to death from various causes, are found to observe *fixed laws*; they are always the same under the same circumstances. It is the enumeration, systematization, and generalization of these facts that constitute what has been happily designated by the illustrious Laplace.

VITAL STATISTICS.

Until comparatively recent times, physicians do not appear to have sufficiently appreciated and employed the valuable instrument of statistical calculation. It is probably, only by the assistance of such an exact test, that we shall eventually arrive at fixed conclusions respecting the efficacy of different modes of treating disease, and the prognosis to be formed regarding the probable issue of various maladies. In the history of the more demonstrative sciences, it will be found that it is the introduction and use of *accurate numerical measures* that forms the prelude to the epoch of rapid advancement. The theory of gravitation in astronomy, that of definite proportions in chemistry, and that of luminiferous undulations in optics, are all *numerical theories*, susceptible of mathematical expression. There is, of course, no *absolute certainty* beyond the pale of pure mathematics, as probabilities pertain even to the most perfect of the mixed mathematical sciences; nevertheless, the extent to which any science admits of the application of numbers may be regarded as a fair measure of its *exactness*.

In respect of a single individual, or a small number of persons, the uncertainty of the duration of life is proverbial. But the case is entirely changed when *multitudes* are concerned; and there are few classes of contingent events of which the results can be predicted with so little risk of departure from the truth, as the average age to which the lives of a considerable number of persons will be prolonged. Various as are the causes operating in the production of disease, it is now demonstrated that mortality is subject to a *law*, the operation of which is scarcely less regular and certain than that of gravitation. Deaths and their causes are scientific facts, admitting of mathematical analysis, and medicine, like other natural sciences, is beginning to substitute numerical expressions for crude hypotheses and vague conjectures. Our existing means of observation, and the present state of mathematical analysis, are still too imperfect to enable us to trace the elements of the human body through the cycle of organization, but these same obstacles are encountered even when dealing with the inorganic atoms of chemistry and the multifarious phenomena of meteorology.

In this, as in all genuine sciences, our knowledge becomes real and scientific only in so far as it is *verified* in particular facts, and thus established in *general propositions*.

Of late years such advances have been made in the science of pathology, and the systems of registrations have been so much improved, that we may reasonably hope, before long, to secure results of the most interesting and useful import to the medical philosopher. Indeed, on many important points valuable deductions have already been drawn from the discussions of statistics of mortality. But it appears to me that in discussing the *available statistical data*, medical writers have *failed to obtain from them the true value of the facts contained in the numbers*. It is to this *aspect of the subject* that I desire to direct the attention of the medical profession of this country. The *specific point* to which attention is drawn is the *necessity of estimating the relative tendency to special diseases, by comparing the mortality with the number of persons living*.

In comparing the general mortality of different countries and cities, this method is usually adopted, and most valuable results have thus been secured. But when the *relative mortality from different diseases* is discussed, it is usual to make the *total mortality* the basis of comparison. Such estimates may give rise to the most *erroneous* conclusions. For example, in London, during the last century, the total mortality has decreased from one in twenty to one in forty of the entire population at the two extreme periods. Hence, assuming the number of deaths from some special disease to the number *living* to have been *constant* during this time, the proportional results deduced from a comparison of the total mortality at the end of the century with the number dying from this particular disease at the same epoch, would apparently indicate a *duplication* of the mortality from this disease in one hundred years; when, in fact, there had been no *real* alteration.

In like manner in discussing the influence of *age* on the mortality from any given disease, it is very common to prepare tables of the number of deaths at each age; and, in some instances, these numbers have been assumed to represent the *relative tendency* to the disease at different ages. This is a very serious error; for it must be borne in mind that the number of persons *living* at different ages is very far from being *equal*.

Writers on "Vital Statistics" need to be reminded in relation to the correct method of discussing the mortuary data. As already indicated, the specific point to which attention is drawn is the necessity of estimating the relative mortality from special diseases by comparing the number of deaths from the given cause with the number of persons living at the ages embraced in the record; instead of making the comparison (as is usually done) with the total deaths from all causes, or with the total number of persons living at all ages.

Indeed, it is so self-evident—so axiomatic—that the true *coefficient of mortality* from any given disease, is expressed by the *ratio* of the number of persons *dying* from the specified disease at the given age, to the number of persons *living* at the same age, that it seems most extraordinary that those medical men whose function it is to discuss mortuary statistics, have, in a great measure, neglected to make this ratio the basis of the comparative mortality from different diseases in different countries and in different cities.

Even in estimating the *general mortality* by comparing the total annual deaths with the number of persons living at all ages, *misleading results* may be deduced from such figures. Thus, the apparent *low* general mortality of San Francisco, as compared with several eastern cities, is, with-

out doubt, due to the *abnormal* condition of its population; to the larger proportion of *adults* as compared with *children*; for the mortality among adults is always low as compared with children. Hence, the general mortality in relation to the whole population comes out *abnormally low*. It will be seen hereafter that this result so flattering to our self-sufficiency is by no means sustained by the application of more correct methods of comparison. Moreover, when *age* comes in as an important element in the mortality from specific diseases, as estimated by the number of deaths from the given disease, compared with either the total number of deaths or with the total number of persons living at all ages, the seriously misleading character of the figures thus deduced becomes truly appalling, especially when the population has not attained its normal condition. But, under no circumstances, do the ratios thus obtained express the true *coefficient of mortality* from the given disease or the relative tendency of such disease to destroy human life.

To illustrate this point, let us take *Cholera Infantum*. How erroneous and misleading it would be to estimate the relative mortality from this disease in the city of San Francisco, as compared with that in eastern cities, by the ratio of the deaths from this disease, either to the total deaths, or to the total population of the cities respectively compared. It is obvious that the true coefficient of mortality for cholera infantum, in any case (whether the population is normal or abnormal), is expressed by the *ratio of the number of deaths from this disease to the number of persons liable to be attacked by it*. In the foregoing example this would be indicated (sensibly) by the ratio of the number of deaths from cholera infantum to the number of children living under three years of age. This is an *extreme case*, but it furnishes a *glaring instance* of the *fallacy* of estimating the relative mortality from infantile diseases in different countries or cities, from the ratio of the number of annual deaths from such diseases to the total deaths from all causes, or to the total population living at all ages. But in all cases the ratio of the number of deaths at any age to the number of persons living at that age furnishes a correct expression for the relative mortality at the given age—that is the *real coefficient* of mortality, independently of the distribution of population at different ages.

These considerations are so self-evident, that there must be some reason why mortuary statistics have not universally been discussed from this point of view, instead of the fallacious and misleading one which has been indicated. In reply to letters of inquiry in relation to this point, I have been informed that it is impossible to obtain the statistics of the number of persons living at each age or period of life. But, it seems to me that this difficulty is greatly exaggerated—that it is by no means insuperable, and should not interfere with the application of the correct method to our mortuary records. This will be apparent from the following considerations:

1. The national census, which is taken every *ten years*, should furnish trustworthy estimates for that year of the number of persons living and dying at each age, or, at any rate, of the number living and dying at each quinquennial or decennial period of life. And the successive censuses give us the *rate of increase* of population at each period of life; so that the number of persons living at each period of life during the years intervening between the censuses may be *estimated* with sufficient approximation to accuracy for the purposes under consideration, while the annual death records will furnish the mortuary data.

2. The school census, which is taken every year, furnishes a trustworthy enumeration of the youths living at each age, from birth to seventeen years of age; and this is precisely the period of life in which the increase

of population is most uncertain, and, consequently, the estimates, based upon the successive national censuses, are liable to be most inaccurate. For *adults*, the data furnished by the United States census are sufficiently accurate to enable us to estimate for each intervening year the number of persons living at each age.

It thus appears to be evident that the vital and mortuary statistical data required for computing the true coefficient of mortality for each disease at each age can be obtained with sufficient accuracy for making the comparisons for different countries and cities alike trustworthy and instructive. The only real obstacle in the execution of the project is the persistent attention, care, time, and labor required in the performance of the arithmetical operations for deducing the numerical ratios. This is, indeed, a most serious difficulty; but I am quite sure that there are those to be found in the ranks of the medical profession who possess that combination of intelligence, leisure, and tenacity of purpose requisite for undertaking such an arduous task. One thing is absolutely certain, viz.: That the rich and precious mortuary data, which for many years have been accumulating, must remain comparatively barren in instructive deductions until this gigantic statistical labor is performed.

GENERAL MORTALITY FROM ALL CAUSES AT DIFFERENT AGES.

As a slight foretaste of the character and results of such statistical work, I herewith submit to the consideration of the reader the numerical data collected in Table I, relating to the United States and to twenty-four of the States. The numerical data in the columns headed "Living in 1870," and "Deaths in 1870," are taken from the "Federal Census" for the year 1870. The deduced numbers in the successive columns headed "Deaths in One Thousand Living" are obtained by dividing one thousand times the number of deaths at the giving period of life by the number living at the corresponding period; in other terms, the numbers in these columns are equal to one thousand times the *mean coefficient* of mortality from all causes at the given period of life. In early life, the mortality decreases so rapidly and so *irregularly* with increasing age, that the *quinquennial* interval is too large to secure accurate mean coefficients from birth to five years of age; but the error is comparatively slight, and does not influence *relative* proportions. Of course, the *shorter* the vital and mortuary intervals, the more accurate would be the deduced coefficients; and, for scientific purposes, it would be desirable to have the interval as small as *one* year. The census furnished the data for intervals from one to two, two to three, three to four, and four to five years of age; but it is not deemed important or necessary to make this amplification of the table. And for similar reasons, the computations have not been extended beyond the age of thirty years. I have restricted my statistical researches to the *white* population, for the obvious reason that the data in the census in relation to the *colored* population are notoriously untrustworthy.

TABLE I.
White Population—Census for 1870.

STATES.	AT ALL AGES.			FROM 0 TO 1 YEARS.			FROM 0 TO 5 YEARS.			FROM 5 TO 10 YEARS.		
	Living in 1870.	Deaths in 1870.	Deaths in 1,000 Living.	Living in 1870.	Deaths in 1870.	Deaths in 1,000 Living.	Living in 1870.	Deaths in 1870.	Deaths in 1,000 Living.	Living in 1870.	Deaths in 1870.	Deaths in 1,000 Living.
United States	33,589,377	424,140	12.63	947,309	94,555	98.81	4,719,792	187,636	39.76	4,151,715	22,178	5.34
1. Alabama	521,394	4,737	9.09	15,055	723	48.02	77,249	1,461	18.87	66,168	255	3.85
2. California	499,421	8,427	16.87	13,317	1,788	134.26	66,742	3,882	50.67	60,180	582	9.34
3. Connecticut	527,549	6,670	12.64	11,794	1,101	93.35	57,615	1,895	32.89	52,130	273	5.24
4. Georgia	638,926	6,368	9.97	13,963	1,264	66.56	63,580	2,285	35.67	78,678	343	4.30
5. Illinois	2,511,061	33,342	13.28	73,442	9,150	116.95	396,468	16,808	43.49	336,435	2,121	6.30
6. Indiana	1,655,387	17,320	10.46	50,271	3,318	76.35	249,496	7,151	28.64	226,346	988	4.28
7. Kentucky	1,098,682	11,311	10.30	34,976	2,842	81.26	172,352	4,624	26.83	152,687	501	3.28
8. Louisiana	392,065	7,593	20.97	10,885	1,732	159.12	53,022	2,890	53.37	45,010	380	8.18
9. Maryland	605,497	7,446	12.30	16,941	1,576	98.03	83,052	3,140	37.81	74,714	389	5.21
10. Massachusetts	1,443,156	25,487	17.66	32,673	5,178	158.48	155,460	9,068	58.33	138,706	980	7.07
11. Michigan	1,167,282	10,910	9.35	32,168	2,607	77.88	161,910	4,458	27.53	143,849	585	4.07
12. Mississippi	382,806	3,712	9.70	12,061	672	55.74	50,574	1,264	24.22	47,190	222	4.70
13. Missouri	1,603,146	26,266	16.38	63,920	6,689	130.20	268,378	12,873	49.84	222,593	1,680	7.50
14. New Hampshire	371,697	4,281	11.48	5,731	486	84.80	39,622	981	31.43	28,171	142	5.04
15. New Jersey	875,407	10,139	11.58	24,083	2,389	99.20	115,869	4,504	38.87	102,561	560	5.46
16. New York	4,330,210	67,709	15.64	103,315	15,260	148.42	515,339	27,601	53.66	478,673	2,383	6.14
17. North Carolina	678,470	6,087	8.97	18,466	1,068	57.84	97,807	1,980	19.73	83,631	252	3.02
18. Ohio	2,601,946	28,494	10.96	73,787	6,361	86.21	366,540	11,314	30.87	328,912	1,220	3.71
19. Pennsylvania	3,456,609	50,973	14.75	97,679	11,358	121.40	484,736	22,421	46.25	425,529	2,977	7.00
20. South Carolina	289,667	2,445	8.44	7,693	382	49.66	41,158	780	17.74	34,715	132	3.80
21. Tennessee	686,119	9,778	10.45	29,173	2,188	75.00	147,320	3,733	25.34	123,409	441	3.57
22. Vermont	323,613	3,537	10.73	7,104	529	74.47	37,251	919	24.67	34,361	143	4.16
23. Virginia	712,069	7,532	10.58	20,043	1,647	82.17	100,966	2,803	27.76	83,701	280	3.35
24. Wisconsin	1,051,351	9,914	9.43	30,940	2,210	71.43	156,643	4,415	28.19	145,622	651	4.47

TABLE I—Continued.

STATES.	FROM 10 TO 15 YEARS.			FROM 15 TO 20 YEARS.			FROM 20 TO 25 YEARS.			FROM 25 TO 30 YEARS.		
	Living in 1870.	Deaths in 1870.	Deaths in 1,000 Living.	Living in 1870.	Deaths in 1870.	Deaths in 1,000 Living.	Living in 1870.	Deaths in 1870.	Deaths in 1,000 Living.	Living in 1870.	Deaths in 1870.	Deaths in 1,000 Living.
United States	4,136,461	12,815	3.10	3,511,096	16,402	4.67	3,235,028	21,465	6.64	2,681,552	19,283	7.19
1. Alabama	76,961	237	3.10	64,407	269	4.18	56,335	321	5.69	37,692	243	6.45
2. California	49,523	221	4.46	33,976	217	6.39	39,584	316	7.98	46,871	428	9.13
3. Connecticut	64,133	201	3.71	50,313	233	4.63	49,471	365	7.18	44,649	323	7.23
4. Georgia	91,489	284	3.10	76,992	329	4.27	68,745	370	5.38	45,865	286	5.58
5. Illinois	318,948	1,068	3.41	257,958	1,231	4.77	238,336	1,469	6.16	203,179	1,382	6.90
6. Indiana	220,420	569	2.58	184,820	823	4.45	156,897	985	6.28	125,537	811	6.45
7. Kentucky	147,302	417	2.83	122,175	510	4.17	107,352	677	6.31	81,490	526	6.45
8. Louisiana	48,276	241	4.99	39,983	275	6.89	35,032	305	11.28	28,168	421	14.85
9. Maryland	73,904	212	2.87	65,061	266	3.94	56,967	319	5.70	47,444	300	6.32
10. Massachusetts	147,149	591	4.02	140,686	953	6.78	142,556	1,354	9.60	128,766	1,327	10.31
11. Michigan	138,428	397	2.65	117,502	484	4.12	93,667	575	6.14	100,035	610	5.10
12. Mississippi	53,646	145	2.70	46,524	211	4.54	42,354	292	6.19	28,962	187	6.46
13. Missouri	210,479	853	4.05	167,256	1,028	6.15	155,285	1,313	8.46	130,009	1,128	8.58
14. New Hampshire	31,808	97	3.05	31,479	183	6.13	29,235	292	8.96	24,448	185	7.57
15. New Jersey	100,344	231	2.30	85,276	289	3.39	80,647	412	5.11	73,794	388	5.26
16. New York	478,689	1,494	3.12	428,562	2,052	4.79	408,680	3,113	7.62	361,689	3,091	8.75
17. North Carolina	92,349	214	2.32	78,441	300	3.82	70,216	360	4.98	46,296	234	5.05
18. Ohio	326,746	754	2.25	281,482	1,124	3.17	247,603	1,448	5.85	201,006	1,350	6.72
19. Pennsylvania	415,580	1,409	3.39	361,231	1,582	4.38	330,220	2,192	6.64	278,948	2,110	7.56
20. South Carolina	39,223	101	2.58	33,473	117	3.50	30,682	117	3.81	21,004	108	5.14
21. Tennessee	128,075	349	2.72	107,449	505	4.70	96,918	633	6.74	69,016	536	7.77
22. Vermont	84,854	99	2.84	83,587	148	4.41	79,337	169	5.76	24,845	153	6.16
23. Virginia	93,060	197	2.12	79,083	276	3.49	70,820	360	5.08	51,493	319	5.90
24. Wisconsin	139,610	387	2.77	110,162	412	3.74	87,029	414	4.76	70,234	351	5.00

In Table II, the computed results contained in Table I are segregated, and the States are arranged in the order of increasing magnitude of the death rate per one thousand living between birth and five years of age. The results indicated in this table are somewhat unexpected and surprising; but they are nevertheless quite significant. The order of States strikingly exhibits the fact that *density of population*, or *urban life*, is the controlling element in determining the magnitude of the coefficient of mortality among children under five years of age. Those States having the greatest number of populous cities and towns have the *highest death rate*, and stand *lowest* on the list. The position of Vermont (No. 6) clearly shows that the severity of winter climate is quite subordinate to other mortuary influences. A glance at the numbers in the column headed "0 to 1 year," reveals nearly the same order for the magnitude of the death rate for infants under one year of age, as for children under five years of age.

TABLE II.

Deaths in 1870, per One Thousand Living at Quinquennial Periods of Life.

States arranged in order of increasing magnitude of death-rate between birth and 5 years of age, or 0 to 5 years.

STATES.	All Ages.	0 to 1 Years.	0 to 5 Years.	5 to 10 Years.	10 to 15 Years.	15 to 20 Years.	20 to 25 Years.	25 to 30 Years.
United States	12.63	99.81	39.76	5.34	3.10	4.67	6.64	7.19
1. South Carolina	8.44	49.66	17.74	3.80	2.58	3.50	3.81	5.14
2. Alabama	9.08	48.02	18.87	3.85	3.10	4.18	5.69	6.45
3. North Carolina	8.97	57.84	19.73	3.02	2.32	3.82	4.98	5.05
4. Mississippi	9.70	55.76	21.22	4.70	2.70	4.54	6.19	6.46
5. Georgia	9.97	66.55	23.67	4.30	3.10	4.27	5.38	5.58
6. Vermont	10.73	74.47	24.67	4.16	2.84	4.41	5.76	6.16
7. Tennessee	10.45	75.00	25.34	3.57	2.72	4.70	6.74	7.77
8. Kentucky	10.80	81.26	26.33	3.28	2.83	4.17	6.31	6.45
9. Michigan	9.35	77.93	27.53	4.07	2.65	4.12	6.14	5.10
10. Virginia	10.58	82.17	27.76	3.35	2.12	3.49	5.08	6.20
11. Wisconsin	9.43	71.43	28.19	4.47	2.77	3.74	4.76	5.00
12. Indiana	10.46	75.95	28.64	4.23	2.58	4.45	6.28	6.46
13. Ohio	10.95	86.21	30.87	3.71	2.25	3.17	5.85	6.72
14. New Hampshire	13.48	84.80	31.43	5.04	3.05	6.13	8.96	7.57
15. Connecticut	12.64	93.35	32.89	5.24	3.71	4.63	7.18	7.23
16. Maryland	12.30	98.03	37.81	5.21	2.87	3.94	5.70	6.32
17. New Jersey	11.58	99.20	38.87	5.46	2.30	3.39	5.11	5.26
18. Illinois	13.28	116.65	43.49	6.30	3.41	4.77	6.16	6.80
19. Pennsylvania	14.75	121.40	46.25	7.00	3.39	4.38	6.64	7.56
20. Missouri	16.38	130.20	49.84	7.50	4.05	6.15	8.46	8.58
21. California	16.87	134.28	50.67	9.34	4.46	6.39	7.98	9.13
22. Louisiana	20.97	159.12	53.37	8.18	4.90	6.89	11.28	14.95
23. New York	15.64	148.42	53.56	6.14	3.12	4.79	7.62	8.75
24. Massachusetts	17.66	158.48	58.33	7.07	4.02	6.78	9.50	10.31

It is noticed, with regret, that the position of California (No. 21) indicates a *high* coefficient of mortality among children, which ill accords with the reiterated boast of the superior salubrity of its climate. To some extent, doubtless, this high mortality among children may be due to the large fraction of the population of the State which is crowded into the City of San Francisco. Nevertheless, it may be proper to add, that California ranks comparatively *high* in its death rate at *all periods* of life, as may be seen by an inspection of the numbers in Table II. This significant fact must warn us that our State affords a proper domain for the rational application of sanitary regulations.

The position of Louisiana is exceptional, especially in its high mortality among *adults*. This is probably due to the large mortuary influence of the City of New Orleans.

It would be interesting as well as instructive to compare, in a detailed manner, the above results, with those deduced from the census of 1880. The annexed supplementary *table*, relating to mortality under five years of age in *eight* States, seems to indicate a *higher* mortality in all of them in 1880, as compared with 1870, with the *exception* of California and Louisiana. Perhaps the obvious disparity in the numbers deduced from the two census returns may be due to improved registration of both the living and the dead:

White Population.—Census of 1880.

STATES.	Living Under 5 Years in 1880.	Deaths Under 5 Years in 1880.	Deaths in 1,000 Living in 1880.	Deaths in 1,000 Living in 1870.	Deaths in 1,000 Living at all Ages in 1880.	Deaths in 1,000 Living at all Ages in 1870.
Alabama	110,802	3,291	29.70	18.87	12.58	9.08
North Carolina	138,079	5,081	36.81	19.73	14.03	8.97
Georgia	133,993	4,334	32.34	23.67	12.48	9.97
Vermont	33,972	1,208	35.56	24.67	15.12	10.73
California	90,537	3,258	35.99	50.67	13.64	16.87
Louisiana	69,794	2,415	34.60	53.37	15.47	20.97
New York	552,167	32,763	59.52	53.56	17.28	15.64
Massachusetts	177,225	11,415	64.41	58.33	18.55	17.66

MORTALITY FROM SPECIAL DISEASES.

As previously indicated, it is in estimating the mortality from *special causes* that the fallacy of the ordinary methods is most conspicuous and misleading. In relation to special diseases, it is customary to compare the number of deaths from the given malady with the total deaths from all causes, or with the total number of persons living at all ages. We have already shown that the proportional numbers thus deduced do not accurately represent the relative tendency of such disease to destroy human life; but that the true *coefficient of mortality* for any given malady is expressed by the *ratio* of the number of *deaths* from the given disease at the given age to the number of persons *living* at the same age. Of course, the fallacy of the ordinary methods of comparison is most conspicuous and striking, when *age* is the controlling element in the liability to attack from the specified disease. In such cases, the correct relative coefficient of mortality is expressed by the number of deaths from the given disease at the given age, in every one thousand persons living at the same age. Thus, for example, phthisis and cancer are essentially diseases of *adult life*; and consequently, it would be manifestly fallacious to estimate the mortality from either of them by comparing the number of deaths with the total number of persons living at all ages, instead of the number of *adults* living.

In illustrating the importance of taking the number of persons living at each age as the basis of comparison in estimating mortality, I have, for several reasons, selected CANCER:

First—Because, in relation to the influence of *age*, it furnishes an *extreme case*, and thus affords a *glaring* illustration of the fallacy of the customary methods of estimating mortality.

Second—Because, in relation to *sex*, and in several other respects, it furnishes an interesting example of mortuary researches.

Third—Because much of the arithmetical portion of the work (by no means an insignificant labor) was performed by me many years ago, so that the population estimates, as well as the numerical comparisons, are at

hand.* It would, doubtless, have been more satisfactory to have included in this discussion the rich and precious vital and mortuary data which have accumulated since these calculations were executed, and to have embraced *other* diseases in the investigations; but the development of this interesting field of research must be reserved for the industry of future statistical investigators. In the meantime, CANCER will serve to illustrate the point to which attention is specifically directed.

1. AGE.—The mortuary data, illustrating the influence of *age* on the development of *Cancer*, are drawn from a memoir, presented to the Academy of Sciences of Paris during the year 1843, by M. TANCHOU. (*Gazette des Hopitaux*, for July 6, 1843.) It embraces nine thousand one hundred and eighteen deaths from cancer, which occurred in the Department of the Seine, in France, during the *eleven* years from 1830 to 1840, inclusive. These mortuary data are collected in the following TABLE, from which many instructive deductions may be drawn.

TABLE III.

AGE.	DEATHS FROM CANCER IN ELEVEN YEARS.			MEAN ANNUAL DEATHS FROM CANCER (COMPUTED).			Ratio of Males to Females.
	Males.	Females.	Both Sexes.	Males.	Females.	Both Sexes.	
1 to 10 years ----	9	14	23	0.818	1.273	2.091	1 to 1.55
10 to 20 years ----	13	13	26	1.182	1.182	2.364	1 to 1.00
20 to 30 years ----	62	169	231	5.636	15.364	21.000	1 to 2.73
30 to 40 years ----	190	822	1,012	17.273	74.727	92.000	1 to 4.33
40 to 50 years ----	339	1,636	1,975	30.818	148.727	179.545	1 to 4.82
50 to 60 years ----	488	1,620	2,108	44.364	147.273	191.637	1 to 3.32
60 to 70 years ----	598	1,469	2,067	54.364	133.545	187.909	1 to 2.46
70 to 80 years ----	398	917	1,315	36.182	83.364	119.546	1 to 2.30
80 to 90 years ----	62	273	335	5.636	24.818	30.454	1 to 4.40
90 to 100 years ----	4	22	26	0.364	2.000	2.364	1 to 5.50
All ages -----	2,163	6,965	9,118	196.636	632.273	828.909	1 to 3.215
20 to 100 years ---	2,141	6,928	9,069	194.636	629.818	824.454	1 to 3.236

From this table we learn the number of persons dying from cancer at each specified period of life; but, as previously intimated, we are by no means warranted in the conclusion which might seem to follow, viz.: that these numbers represent the *relative tendency* to this disease at different ages. This is a most serious error into which many writers frequently fall, when treating of the influence of *age* on the development of diseases. It must be borne in mind that the number of persons *living* at different ages is very unequal. For instance, it appears from the table that one thousand six hundred and twenty females died from cancer between the ages of fifty and sixty, while only nine hundred and seventeen perished from the same cause between the ages of seventy and eighty; but, if the number of females *living* of the former age were somewhat more than *double* that of those alive of the latter age, the *true* proportional mortality at both decennial periods of life would have been nearly *equal*.

In order, therefore, to ascertain with accuracy whether particular ages exercise any influence on the development of the disease, we must com-

* *Vide*, Monograph by the author, entitled "Statistical Researches on Cancer." "Southern Med. and Surg. Journal," new series, vol. 2, pp. 257 to 293, May, 1846.—Also, "Vital Statistics: Illustrated by the Laws of Mortality from Cancer." "Western Lancet," vol. 1, No. 3, pp. 176-189, March, 1872.—Also, "The True Coefficient of Mortality." "Nature," vol. 24, No. 616, p. 357, August 18, 1881.

pare absolute mortality at each age with the number of persons *living* at those ages. As the mortuary records under consideration extend through a period of eleven years, we are not warranted in assuming that the population was *stationary* during this time; but, we may assume, without sensible error, that the population of the Department of the Seine, according to the enumeration of 1836, is a fair estimate of the *average* number living during the eleven years from 1830 to 1840, inclusive. Now, the population of the Department of the Seine (embracing Paris and the *arrondissements* of Sceaux and St. Denis) was, in 1836, one million one hundred and six thousand eight hundred and ninety-one. Assuming the proportional numbers of the sexes to be the same as they were in England about this period, and we have five hundred and forty thousand seven hundred and thirty-eight males and five hundred and sixty-six thousand one hundred and fifty-three females. Again, assuming the number of persons of each sex living at each age in France to be in the same proportion as in England in 1841, and we are furnished with the data required for computing the results embraced in the following table. The numerical elements of Table III are of course used in the calculations. The English estimates of the number living at each age are furnished by census of 1841, and may be found in the American Almanac for 1846.

TABLE IV.

AGE.	ESTIMATED NUMBER LIVING.			MEAN ANNUAL DEATHS FROM CANCER IN 1,000 LIVING.		
	Males.	Females.	Both Sexes.	Males.	Females.	Both Sexes.
Under 10 years	139,186	139,840	279,026	0.00588	0.00910	0.00749
10 to 20 years	115,556	115,269	230,825	0.01023	0.01026	0.01024
20 to 30 years	92,736	104,342	197,078	0.06078	0.14725	0.10655
30 to 40 years	69,485	73,203	142,688	0.24858	1.02081	0.64476
40 to 50 years	52,073	54,124	106,197	0.59182	2.74788	1.69068
50 to 60 years	34,607	36,800	71,407	1.28192	4.00198	2.68372
60 to 70 years	22,928	25,703	48,631	2.37111	5.19504	3.86399
70 to 80 years	11,085	12,852	23,937	3.26399	6.48659	4.99417
80 to 90 years	2,866	3,680	6,546	1.96669	6.74408	4.65239
90 to 100 years	216	340	556	1.68110	5.88769	4.25114
All ages	540,738	566,153	1,106,891	0.36364	1.11679	0.74886
20 to 100 years	285,996	311,044	597,040	0.69055	2.02439	1.38077

The foregoing table demonstrates the *inaccuracy* of the prevailing opinion, that the tendency to cancer is at its *maximum* between the ages of thirty-five and fifty years. The abrupt augmentation of *general* female mortality between the ages of forty and fifty, when taken in connection with the equally sudden diminution of the intensity of fecundity among women at the same epoch of life (as exhibited in the Swedish tables), has been supposed to lend support to the validity of the current opinion, respecting the proclivity to uterine and mammary cancer, during the declining activity and cessation of the reproductive functions. But Table IV shows, on the contrary, that, in both sexes, the true coefficient of mortality from cancer goes on steadily augmenting with each succeeding decade until the eightieth year, and among females until the ninetieth; after that period, the number of cases is probably too small to furnish any reliable comparison. No *sudden and abrupt* alteration of the law of mortality from cancer in the sexes is here exhibited at that critical period of life. In fact, the greatest *increase* of death rate among females takes place between twenty and

thirty, when the intensity of fecundity is probably at its *maximum*. Indeed, after twenty-five or thirty years of age, the *rate of increase* of the death rate with advancing life is *remarkably uniform* among *females* up to eighty; the *average* of these five decennial periods being about 1.30 per one thousand living for *each decade*. Among *males* the increase is not so regular; arising, probably, from the smaller numbers embraced in our statistical data.

The numbers in the following table will illustrate several points in relation to the proper method of estimating the mortality from cancer. The numerical data of Tables III and IV are used in the computations.

TABLE V.

(1) AGES—YEARS.	(2) NUMBER LIVING.		(3) MEAN ANNUAL DEATHS FROM CANCER.		(4) ANNUAL DEATHS FROM CANCER IN 1,000 LIVING AT ALL AGES.		(5) ANNUAL DEATHS FROM CANCER IN 1,000 LIVING AT EACH AGE.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
Under 10 years	139,186	139,840	0.818	1.273	-----	-----	-----	-----
10 to 20 years	115,556	115,269	1.182	1.182	-----	-----	-----	-----
20 to 30 years	92,736	104,342	5.636	15.364	0.0104	0.0271	0.0608	0.1473
30 to 40 years	69,485	73,203	17.273	74.727	0.0319	0.1320	0.2486	1.0208
40 to 50 years	52,073	54,124	30.818	148.727	0.0570	0.2627	0.5918	2.7479
50 to 60 years	34,607	36,800	44.364	147.273	0.0824	0.2601	1.2819	4.0020
60 to 70 years	22,928	25,703	54.364	133.545	0.1006	0.2359	2.3711	5.1956
70 to 80 years	11,085	12,852	36.182	83.364	0.0669	0.1508	3.2640	6.4866
80 to 90 years	2,866	3,680	5.636	24.818	0.0104	0.0438	1.9687	6.7441
90 to 100 years	216	340	0.364	2.000	0.0007	0.0035	1.6811	5.8877
All ages ----	540,738	566,153	196.636	632.273	0.3636	1.1168	0.3636	1.1168
20 to 100 years	285,996	311,044	194.636	629.818	-----	-----	0.6806	2.0244

The numbers in columns (3) and (4) in the foregoing table might seem to support the popular idea that the mortality from cancer attains its maximum between the ages of forty and sixty years; but, as we have previously shown, the numbers in column (5) are evidently the *true indices* of the relative tendency to this disease at different ages; and it will be observed that the death-rate per one thousand living at each age among females goes on steadily augmenting with each succeeding decade of age up to ninety years. A glance at the numbers in columns (4) and (5) is sufficient to illustrate the fallacy of estimating the *relative tendency* to cancer at different ages by the ratio which the annual deaths from it at each age bears to the *total* population living, instead of the number living at *each age*. These facts may be expressed *graphically*, according to the method of analytical geometry, as represented in annexed *diagrams*.

In these diagrams the lengths of the horizontal lines indicate (on the scales above given), the proportional numbers in columns (4) and (5) in Table V. A comparison of the two diagrams renders manifest to the eye the fallacy and misleading character of the method of estimating the mortality from cancer at different ages in the manner represented by the diagram on the *left*. It is obvious that the same fallacy is involved in every method of estimating the influence of *age* on mortality by comparing the number of deaths at each period of life with any *fixed numerical quantity*. Hence, in deducing the influence of *age* on the *death-rate*, the following methods give *fallacious* results:

- (1.) The *relative number* of deaths at each period of life.

(2.) The *ratio* of the number of deaths from the *given cause* at each age, to the *total* number of deaths from the *same cause*, in the same population and at the same epoch.

(3.) The *ratio* of the number of deaths from the *given cause* at each age, to the *total* number of deaths from *all causes* in the same population and at the same epoch.

(4.) The *ratio* of the number of deaths from the *given cause* at each age, to the *total* population living at *all ages* and at the same epoch.

In the case of cancer, *each* of the foregoing *fallacious* methods, when represented by a *graphic projection*, would form a diagram similar to that on the *left*.

The fact likely to be most strongly impressed on the reader by the numbers in column (5) of Table V, as well as the delineation in the diagram on the *right*, is the remarkable *regularity* of the *increase* of the coefficient of mortality from cancer with advancing life among *females* after the age of twenty-five or thirty years. After seventy-five or eighty years of age the law appears to be disturbed by irregularities; but this probably arises from the fact that the number of cases after this epoch is too *small* to admit of useful comparison. Between the ages of twenty-five and seventy-five years the mortality increases nearly in *arithmetical progression* as the age augments in *arithmetical progression*; the mean increment being about 1.30 per one thousand living at each age for each *decade* of advancing life, or about 0.13 per one thousand living at each age for each *yearly* increase of age. Since the mortality augments in arithmetical progression, it follows that the *average* mortality *between* twenty and thirty equals mortality at twenty-five; mortality *between* thirty and forty equals mortality at thirty-five, and so on up to the age of seventy-five. Assuming this to be the *law* of mortality from cancer among *females* in the Department of the Seine, it admits of very simple mathematical expression. Thus, let—

A=Age (in years) at which the *liability* to cancer *begins*;

Ā=Any age (in years) *greater* than A;

K=A *constant numerical coefficient*; probably *variable* according to *country*, *state of civilization*, *density* of population, *race*, etc.;

M=Annual mortality per one thousand living at age Ā.

Then, we have, $M=K \times (\bar{A}-A)$.

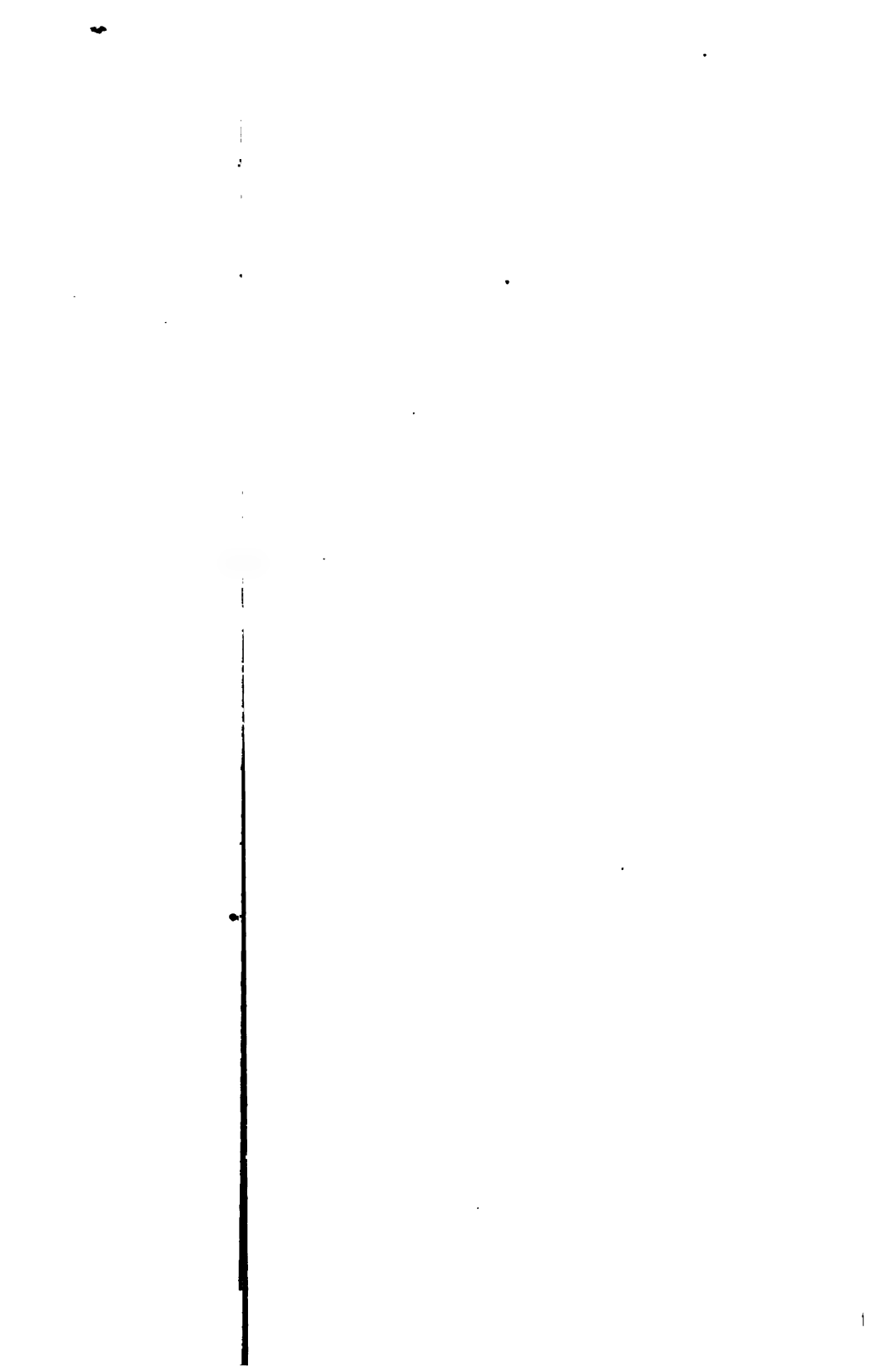
To apply this formula to the statistical data embraced in Tables IV and V, let us assume that the *liability* to cancer *begins* at the age of twenty-five years—that is, $A=25$ years, and that $K=0.13$. Then our formula becomes:

$$M=0.13 \times (\bar{A}-25).$$

The accordance of the results given by this formula with the numbers given in the tables is exhibited in the following numerical comparisons:

AGES.	Values of M. by Tables.	Values of M. by Formula.
25 years	0.14	0.00
35 years	1.02	1.30
45 years	2.74	2.60
55 years	4.00	3.90
65 years	5.20	5.20
75 years	6.48	6.50
85 years	6.75	7.80*

* It is evident, that by the *formula*, the broken line a, b, c, d, e, f, g, h. in the diagram on the right, would be a *straight line*.



The foregoing formula represents the law of increasing mortality from cancer among females with advancing age in the *simplest* form, as a *function of the age*. This extreme simplicity is probably *unique* in the case of cancer, and seems to indicate that *age* is so far the controlling element in the development of this disease as to overpower all other causes. In the case of *other* diseases, we cannot expect to escape the necessity of employing those *exponential* functions in investigating their laws of mortality, which are essential when a multiplicity of causes are in operation.

2. SEX.—The *relative mortality*, or the *relative frequency*, of cancer in the two sexes may be learned from Mr. William Farr's valuable reports on the causes of death throughout England and Wales, as likewise from the statistical data furnished by the researches of M. Tanchou, at Paris. As there exists a certain degree of numerical superiority on the side of the female population, in order to make the comparison perfectly fair, it is necessary to calculate the rate of mortality in relation to the numbers living of *each sex*. This has been done in the annexed *table*:

TABLE VI.

COUNTRY.	Year.	ESTIMATED NUMBER LIVING.		ANNUAL DEATHS FROM CANCER.		ANNUAL DEATHS FROM CANCER IN 1,000 LIVING.		RATIO OF MALES TO FEMALES.
		Males.	Females.	Males.	Females.	Males.	Females.	
England and Wales	1838	7,469,450	7,829,451	620	1,828	0.0830	0.2335	1 to 2.813
England and Wales	1839	7,572,873	7,932,874	660	2,031	0.0871	0.2560	1 to 2.938
Department of Seine	1830-40	540,738	566,153	197	632	0.3636	1.1168	1 to 3.071
Average								1 to 2.941

It would have been more accurate to have compared the number of deaths from cancer for each sex with the number living between the *cancerable ages* (say between twenty and one hundred years), instead of the number living at *all ages*; but while this more correct method would have nearly *doubled* the coefficient of mortality for each sex, yet the *ratio* would *not* have been *sensibly altered*. The foregoing table shows that in both England and France the annual mortality from cancer among females *exceeds* that among males, nearly in the proportion of three to one. This striking difference in the liability to cancer in the two sexes is the more remarkable from the fact that the average annual mortality from all causes, in the English population, in the five years, 1838-42, was 22.94 per one thousand living among males, while it was only 21.24 per one thousand among females. It is true, the *expectation of life* among women exceeds that of men by about two years; and consequently a greater proportional number of the former live to an *advanced age*, the period of life which, as we have seen, is most obnoxious to cancer. But this is wholly insufficient to account for the vast disparity in the mortality from this disease in the two sexes. For, by comparing the numbers given in column (5) of Table V, it will be seen that the excess is maintained by the females throughout life, even long after the reproductive functions have become dormant. And it is a still more remarkable fact that this *ratio* appears to be *sensibly the same* in England and in France. Although, in the Department of the Seine, in each of the sexes (see Table VI), the mortality from cancer was

more than *four times* as great as it was in England at the corresponding epoch, yet the *constancy of the ratio* between the two sexes is not disturbed. These facts indicate a *law* in relation to the influence of *sex* on the development of cancer, which is as *fixed* and as *uniform* in its operation as that of *age*, and seem to point to certain original and fundamental *physiological differences in the sexes* as the *true causes* of the excess of death from this disease among females. That such connate differences do exist seems to be rendered probable from the fact, noticed by Dr. Emerson, of Philadelphia,* that the diseases most fatal to *male* children seem to be of the *sthenic* class, such as attend upon constitutions in which the energies of organic life are highly exalted; whereas, those which are most destructive with *female* children are of the *asthenic* class, characterized by less energy of the forces of organic life, and greater feebleness of the system. It is obvious that *cancer* appropriately belongs to the *latter* class.

3. SECULAR VARIATION OF MORTALITY.—Whether the mortality, or frequency of cancerous diseases, is on the *increase*, or otherwise, is a question of considerable interest and importance; but one to which a satisfactory reply cannot be furnished, until we have the means of properly ascertaining the proportion of the population annually cut off by this disease during a *long series of years*. A little reflection will show that a numerical comparison between the number of deaths from any given cause, and the total mortality from all causes is *not* an accurate test of the relative frequency of the specified disease at several successive epochs. For, not only is the population a variable element, but the general mortality, as compared with the number living, varies with the increase or decrease of epidemic diseases. The most *accurate test* consists in calculating the ratio of the number of deaths from cancer for each year between the *cancerable* ages, to the number of persons living between the *same ages*. But this more correct method involves such an amount of arithmetical labor, that we must be content with the approximate method of calculating the ratio of the whole number of deaths from cancer for each year, to the total population living at the *same time*; for while the *absolute* coefficient will be different, yet the *relative* mortality at successive epochs will not be *sensibly* disturbed. But to make this comparison for a series of years, it is necessary to know the *rate of increase* of the population in which the mortuary records are kept. The enumerations of 1826 and 1836 furnish the data necessary for estimating the population of the Department of the Seine for successive years, and those of 1831 and 1841 offer similar data for England and Wales. With the aid of the foregoing hints, the mode of computing the following table will be apparent to the reader. The numbers indicating the absolute deaths from cancer in each year were obtained from the Memoirs of Tanchou, and the reports of the Registrar-General of England. The first three proportional numbers for London were taken from McCulloch's "Statistical Account of the British Empire," vol. II, second edition, page 577, London, 1839. They are, however, of little value in relation to the question under consideration.

The numbers relating to Glasgow are computed from the data furnished in Nicol's "Vital, Social, and Economic Statistics of the City of Glasgow, 1881-85," pages 36-44. Those relating to Massachusetts are taken from the report of the Massachusetts State Board of Health for 1886, as cited in "Science," vol. X, page 213, October 28, 1887.

* Vide "Amer. Journal of Med. Sciences," January, 1846, p. 91 et seq.

TABLE VII.

	Years.	Estimated Population.	Annual Deaths from All Causes.	Annual Deaths from Cancer.	Deaths from Cancer in 1,000 Deaths.	Deaths from Cancer in 1,000 Living.
London	1723-57	-----	-----	-----	2.00	-----
London	1771-80	-----	-----	-----	3.40	-----
London	1831-35	-----	-----	-----	4.40	-----
London	1837	-----	-----	-----	-----	0.2080
London	1840-41	-----	80,321	638	7.95	-----
Paris	1830-40	909,126	-----	727	-----	0.8014
Sceaux et St. Denis	1830-40	197,765	-----	102	-----	0.5407
Department of Seine...	1830	1,049,793	-----	668	-----	0.6363
Department of Seine...	1831	1,059,100	-----	865	-----	0.8167
Department of Seine...	1832	1,068,491	-----	814	-----	0.7618
Department of Seine...	1833	1,077,964	-----	814	-----	0.7551
Department of Seine...	1834	1,087,521	-----	857	-----	0.7880
Department of Seine...	1835	1,097,164	-----	906	-----	0.8258
Department of Seine...	1836	1,110,891	-----	837	-----	0.7562
Department of Seine...	1837	1,116,705	-----	778	-----	0.6967
Department of Seine...	1838	1,126,006	-----	803	-----	0.7128
Department of Seine...	1839	1,136,594	-----	887	-----	0.7804
Department of Seine...	1840	1,146,672	-----	889	-----	0.7753
Department of Seine (Mean)	1830-40	1,110,891	34,805	829	23.82	0.7550
England and Wales	1838	15,307,065	330,559	2,448	7.4056	0.1599
England and Wales	1839	15,511,264	330,497	2,691	8.1423	0.1735
England and Wales	1840	15,718,183	351,757	2,786	7.9202	0.1772
England and Wales	1841	15,927,867	336,664	2,746	8.1565	0.1724
England and Wales	1842	16,140,344	342,774	2,941	8.5800	0.1822
England and Wales	1860	19,902,713	422,721	6,827	16.1501	0.3430
England and Wales	1861	20,119,314	435,114	7,276	16.7221	0.3616
England and Wales	1862	20,336,467	436,566	7,396	16.9413	0.3637
England and Wales	1863	20,554,137	473,837	7,479	15.7839	0.3639
Glasgow	1881-84	526,000	-----	246	-----	0.4678
Massachusetts	1867	-----	-----	-----	-----	0.2900
Massachusetts	1886	-----	-----	-----	-----	0.5600

A comparison of the proportional numbers contained in the last two columns of that portion of the foregoing table relating to England and Wales, clearly illustrates the fallacy of estimating the relative frequency of cancer by the ratio which the annual deaths from it bears to the total yearly mortality from all causes. For instance, the proportion of deaths from cancer in one thousand deaths is, in 1840, considerably *below* that of 1839; whereas, the ratio per one thousand living is *above* it. In like manner, the mortality in one thousand deaths in 1863 is *below* that of 1862; whereas, the ratio per one thousand living is very slightly *higher*. On the other hand, in 1841, the ratio of deaths from cancer to the general mortality for that year shows a considerable *increase* in frequency over 1840; whereas, the ratio deduced from the number living at that time indicates a relative *decrease* of deaths from that disease. In fact, it is evident that the total annual mortality—principally from the influence of *epidemics*—is more liable to *fluctuations* than the mortality from cancer, and, hence, the ratios deduced from a comparison of the two would show a corresponding and proportionate oscillation, wholly independent of any *real* variation in the mor-

tality from cancer. Doubtless the fluctuations in the general mortality are governed by fixed laws; but we are not as yet in possession of sufficient data for estimating the value of the coefficients representing these perturbations, so as to apply them in our average reductions.

In relation to the important question of the *secular increase* in the mortality from cancer, the numbers contained in the *last* column of Table VII (the only *correct criterion*) afford a tolerably satisfactory answer. It will be noticed that the French data indicate, in a general sense, that this disease is *augmenting* in frequency in the Department of the Seine, but the increase is by no means uniform from year to year; it is irregularly progressive. The mortality from this cause seems to have increased in eleven years from 0.636 to 0.775 per one thousand living at the two extreme periods embraced in the records; being equivalent to a *mean annual* increment of 0.0126 per one thousand living.

The English statistics, embracing a period of twenty-six years, furnish results which are far more uniform and satisfactory. These seem to indicate very clearly that there has been a progressive *increase* in the death rate from cancer during the interval in question, from 0.160 in 1838 to 0.364 in 1863, per one thousand living; being a *mean annual* increment of about 0.0785 per one thousand living. This seems to be a most extraordinarily *large* augmentation; but it is fully sustained by the mortuary data furnished by Massachusetts. It thus appears to be pretty clearly demonstrated by these figures, that cancerous diseases are *increasing* in frequency both in France and in England; although the data are probably insufficient to determine the *law* of the increment.

It may be instructive to contrast the mortuary data in relation to coefficient of mortality for *consumption* or *phthisis* with those for *cancer*, so far as they are embraced in the *same* interval of time in the statistics of England and Wales. The annexed table furnishes the results of computations based upon data contained in Table VII, combined with those given in the reports of the Registrar-General of England:

TABLE VIII.

	Years.	Annual Deaths from Phthisis.	Deaths from Phthisis in 1,000 Deaths from All Causes.	Deaths from Phthisis in 1,000 Living.
England and Wales.....	1838	59,025	178.56	3.996
England and Wales.....	1839	59,559	180.21	3.939
England and Wales.....	1840	59,923	170.38	3.897
England and Wales.....	1841	59,592	177.01	3.822
England and Wales.....	1842	59,291	172.97	3.673
England and Wales.....	1860	50,149	118.66	2.520
England and Wales.....	1861	51,931	119.35	2.581
England and Wales.....	1862	50,962	116.73	2.506
England and Wales.....	1863	51,072	107.78	2.485
Massachusetts.....	1867	-----	-----	3.250
Massachusetts.....	1886	-----	-----	2.980

A comparison of the numbers in the last two columns of this table again illustrates the greater *irregularity* of the ratios deduced from the *deaths* from *all causes*, as compared with those computed from the number of persons *living*. But the most interesting and significant fact brought to view by a glance at the numbers in the last column of Table VIII is that in the

case of phthisis—unlike cancer—there is *no indication* of a *secular increase* in the coefficient of mortality. On the contrary, the figures appear to show very manifestly a progressive *decrease* in the death rate from this disease. It is certainly encouraging to discover that the development of medical science with advancing civilization has had an appreciable influence in abating the ravages of this scourge of the human race. In this respect, the *contrast* with cancer, as exhibited by the numbers in the last column of Table VII, is very striking.

Nearly all of our statistical data appear to indicate that in the case of cancer there has really been a *secular increase* in mortality, both in France, and in England and Wales. It would be premature to attempt to express this increment in numbers as a *time-factor* in our formula for the influence of *age* on the mortality from cancerous diseases. The rational discussion of such questions must be postponed until some zealous investigator of vital statistics arises, who has the leisure and the courage to properly analyze the vast accumulation of valuable facts which are entombed in the mortuary registers of the last forty years. It is the opinion of M. Tanchou that cancer, like *insanity*, increases in a direct ratio to the civilization of the country and of the people.*

In regard to the probable *causes* of this presumed increase in the mortality from cancer, it may be proper to remind the reader, that to some extent, the augmentation may be only *apparent*; since it may arise from more careful registration, from improvements in pathology, and from greater accuracy in diagnosis. It is difficult to estimate the influence of these circumstances. But there is another cause of this apparent increase of mortality which is far more *definite*. It is a well established fact, that the *mean duration* of human life has, even within a comparatively short time, been sensibly *increased*, by the rapid advancement of medical science and by a more philosophical application of hygienic and sanitary regulations. In London, according to Mr. Chadwick, the mean duration of human life increased *four years and nine months* in the one hundred and three years from 1728 to 1830. At Geneva, M. Edouard Mallet estimates that the mean duration of life has augmented in two hundred and seventy-four years (from 1560 to 1833) in the proportion of the numbers 100 to 191. Admitting the well determined and powerful influence of *age* upon the production and development of cancer, the *increase* in the duration of life stands in the nature of a *vera causa*, tending to augment the frequency of the disease; inasmuch as a greater proportion of the population would reach that period of existence which is peculiarly obnoxious to such affections. In other terms, the prolongation of human life incident to the progress of civilization must tend to *increase* the frequency of such diseases as are dependent upon advanced age for their production and development. Under this point of view, unless science can discover means of controlling the operation of ulterior causes, the increase of mortality from cancer must,

*The conclusion that cancer is *increasing in frequency* was first announced by the author in one of his earliest papers, entitled: "On Carcinoma in General and Cancer of the Stomach." "Trans. of the Society of Alumni of College of Physicians and Surgeons of the State of New York," No. 1, pp. 9-16, New York, 1842. Also, "New York Lancet," vol. 2, October 29 and November 5, 1842, pp. 284-287, and 299-304. This deduction was based upon the meager and imperfect mortuary data furnished by London, which seemed to show that the ratio of the annual deaths from cancer to the total annual mortality in that city had *increased* in one hundred and thirteen years (1728 to 1841) from 2.00 to 7.95 per one thousand deaths from all causes. (Vide above Table VII.) About eight months later (July, 1843), as already cited, M. Tanchou, by a totally independent course of investigation, arrived at an analogous result, with respect to the prevalence of this disease in France. This induced the author to undertake a more elaborate and rigorous investigation of the question in his Monograph, previously cited, entitled, "Statistical Researches on Cancer," published in May, 1846, which seemed to confirm his original conclusion.

indeed, be coextensive with the progressive advancement of human civilization. Future statistical investigators will be able to test the validity of this pessimistic view, by determining whether the alteration in the duration of life is adequate—through the influence of *age alone*—to explain the *whole* of the observed secular augmentation of mortality.

4. MORTALITY IN FRANCE AND ENGLAND.—We have already incidentally called attention to the remarkable *difference* in the mortality from cancer in France and in England at epochs nearly corresponding. A glance at the numbers contained in Tables VI and VII reveals a most striking and singular fact, viz.: the *enormous excess* of the mortality from cancer in the Department of the Seine, as compared with that in England and Wales at sensibly the same epoch. Of course, in view of the large *secular variation* of mortality, no comparison can be perfectly *fair* that does not involve sensibly the *same* period of time or years. The numbers in the last column of Table VII show that the proportional mortality from cancer—1830–40—in France, is to the mortality in England—1838–42—as 755 to 173. It is very difficult to imagine a plausible explanation of this curious and perplexing disparity. Perhaps some may be disposed to ascribe it to a greater latitude in the application of the term *cancer* on the Continent. But the English bills of mortality—at least since the Registration Act has been in operation—do not exhibit any such difference in the nomenclature of disease. Both in France and in England nearly all local malignant affections are included under the name cancer. Moreover, even if, with Mr. Farr, we include *tumors of uncertain seat* among the cancerous affections the disparity is *not sensibly* altered. For, making this allowance, the ratio becomes 755 to 191. So that the mortality from cancer in the Department of the Seine is nearly *quadruple* what it is in England and Wales, about the same time. Perhaps the habit of making necroscopic examinations may be more common in the French metropolis than it is in England; and thus a greater number of *internal* cancers may be detected and registered. But it is hardly reasonable to suppose that the disparity growing out of this circumstance would amount to the enormous proportion of 4 to 1. In view of M. Tanchou's idea, that the mortality from cancer is in a *direct ratio* to the intensity of human civilization, it may be, to some extent, consolatory to the inhabitants of England to discover that their more recent mortuary records, from 1860 to 1863, inclusive, indicate a very remarkable *increase* in the death rate from this disease.

The exact agreement in the proportional mortality from cancer among *males* and *females* in the two countries in question, as exhibited in Tables V and VI, demonstrates that whatever may be the cause of the disparity, *it operates with equal intensity upon both sexes*. We have no means of ascertaining what may be the influence of diet, habits of life, physical geography, etc., on the production of cancerous affections. Neither is it possible to estimate what share *governmental* influences may have in the induction of the peculiar predisposition to such diseases. In assigning a relative value to the various causes which concur in the production and development of chronic maladies, physicians have almost entirely overlooked the evils, moral and physical, which have their origin in the *endemic agency of bad government*. Doubtless, in many instances, physical influences are, in a measure, subordinate to this silent and potent agent. Its operation is slow, insidious, and, perhaps, inappreciable amid the multiplicity of surrounding disturbing causes; but it is constant and unrelenting, and the effects are certain and inevitable. The canker of discontent and restlessness, which corrodes the vitals of a high strung and intelligent people, degraded and oppressed by misrule during a series of

generations, must react on the physical system in a most powerful manner. So far as France is concerned, it may be difficult to reconcile the operation of such a cause with the proverbial gayety and elasticity of spirits which characterize her people. Yet it has been remarked that many of the cases of cancer of the stomach detailed by M. Chardel were furnished him during or immediately subsequent to the "Reign of Terror."

The want of access to the rich treasures of more recent mortuary records precludes the satisfactory discussion of many points in relation to cancer, such as the influence of habitation, occupation, married and single state, climate, season, etc., on the mortality from this disease.

In relation to *organs affected*, the researches of M. Tanchou show that the *uterus* is most liable to cancer, constituting about 32.8 per cent of the total deaths from the disease. The *stomach* comes next, 25.2 per cent; then the *mamma*, 21.7 per cent; and then the *liver*, 6.3 per cent, etc. Among *females* the mortality from *cancer uteri* is about 43 per cent of the total deaths from the disease in that sex, and the *mamma* 28.4 per cent. These proportions relate to the mortality from cancer in the Department of the Seine, in France. It would be interesting to secure similar statistical data in relation to England, so as to trace, if possible, the cause of the disparity in the mortality from cancer in these two countries. Such data are unquestionably entombed in the "Reports of the Registrar-General," but it would require the prolonged labor of an expert to extract them.

In conclusion, it is proper to remark that the science of vital statistics is in its infancy. This is the period for collecting facts; for multiplying observations; for establishing the basis for wider and higher generalizations. The condition of man in almost every region of the globe is changed, and we have only to look around us in the narrowest circle of the community to behold elements and principles in action, of whose existence a few years ago we had no conception. There are impulses on an immense scale impelling population forward; artificial wants of a new kind constantly creating; and the basis of the social system is widening and spreading into innumerable forms on every side. The "great constants" (to adopt an idea of the late Mr. Babbage), which mark these important changes, it is the business of statistical science to collect. Governments, perhaps for other reasons than those of a purely scientific nature, have become interested in the matter. The *census* is more carefully taken; *registrations* of births and deaths are more accurately noted. The medical philosopher is now furnished with better and more reliable data as the basis of his investigations. The census returns enable him to make population estimates for *every period of life*, and there is no reason why this *more accurate basis* should not be employed in discussing the relative mortality from different diseases. The problems presented are of the most complicated character, and all the resources of science are required to enable us to lay an effectual grasp upon them. We can scarcely expect the science of *living* matter to be less difficult, less complex, less in need of the resources of observation, experiment, and calculation, than the science of *dead* matter, than astronomy, physics, or chemistry.

BERKELEY, CALIFORNIA, August 16, 1888.

NOTES ON TOPOGRAPHY, AND ON THE DISTRIBUTION OF PLANTS IN CALIFORNIA.

By W. P. GIBBONS, M.D., Alameda.

The Pacific Ocean furnishes nearly all the vapor for rains and storms for the greater part of this continent. It extends from the Arctic to the Antarctic Ocean, and covers an approximate area of fifty million square miles. From the time that the sun has passed the autumnal and returned to the vernal equinox, the full intensity of his rays are cast upon the surface of this immense ocean south of the equatorial belt. From March to September the greater heat falls north of the equator; in either case, large evaporation of water occurs, which has been estimated to aggregate fifteen inches of ocean surface; greater in the southern hemisphere, principally on account of its larger area of water. It will be taken for granted that the reader is familiar with the literature of trade winds, and with the theories connected with the formation and distribution of storms; as these are incidental but important points in connection with this essay.

Passing from west to east and between the parallels of 35 degrees and 40 degrees, the geological formation of California naturally divides its climate into three distinct sections: 1st. The Coast Range, extending about forty miles from the ocean to Mt. Diablo, on the western edge of the great valley; 2d. The San Joaquin and Sacramento Valleys, continuous in a northeasterly axis, about four hundred miles long and from forty to seventy miles wide; 3d. The Sierra section, which includes the foothills and mountains of that name. The Sierra Mountains, not less than nine thousand to twelve thousand feet high, form the great eastern wall of the valley, while the Coast Range, with its average of one thousand two hundred or one thousand five hundred feet of elevation, with peaks interspersed from three thousand to fifteen thousand feet high, constitutes its western side. As the foothills of the former range are traversed easterly, extensive areas of oak appear in places, which give way at a higher elevation, to numerous members of coniferae, to manzanita, to alder, and other alpine vegetation.

For about forty miles inward from the commencement of the foothills, and to an elevation of four thousand feet above sea level, the winter climate is bland, seldom marking a temperature below 30 degrees, while in summer, in the absence of western winds, the range is from 70 degrees to 110 degrees. The average rainfall is between forty and fifty inches, though during some seasons much less. Occasionally winds sweep down from higher localities which are covered with snow, and the temperature may thus be reduced for days together. As a general rule fogs are an exception.

The necessary condition of the Sacramento and San Joaquin Valleys is that of a desiccated, treeless plain, except in proximity to river banks, where vegetation has flourished and belts of alluvium have been deposited. In such places, scattered groups of oaks and lines of willow and cottonwood, with occasional displays of sycamore, relieve the tedium of the vista. The vertical rays of the summer sun fall upon it with full intensity, giving a temperature from 80 degrees to 115 degrees. No dews or fogs alleviate the oppressive heat. About the southern extremity sandstorms are not unfrequent; while from the northern end there sweep down occasionally siroccos, which sear vegetation in their course, and which find an outlet through the western side of the Coast Range along the course of the rivers.

A noticeable feature on both sides of the valley is the absence of running water after the cessation of winter rains. Though maps designate more than fifteen gulches debouching from the west side of the Coast Range into the valley, which are dignified by name of rivers, not one of them contains running water during the summer months. The average rainfall along the Coast Range is about twenty inches; it gradually decreases in quantity toward Southern California; while in the great valley it seldom exceeds three or four inches. The general topography of California may be summarized as having a territory of one hundred and fifty-seven thousand eight hundred square miles, along the center of which is a valley from forty to seventy miles wide, flanked on either side by mountain ranges, and having on the line of its longitudinal axis two rivers, the San Joaquin and the Sacramento, both of which receive numerous tributaries and debouch from nearly the same point through Suisun and San Pablo into San Francisco Bay.

From Mt. Diablo west to the ocean, the climate of the foothills is greatly modified. Much of this section comes within the range of the westerly winds of summer; all of it, more or less, is the recipient of fogs, which prevail with varying density from April to September. The humidity of the ocean atmosphere varies, as does that over the territory of the foothills. There may be fog banks on the ocean and none on the land; or there may be fog on the land and none on the ocean; again, fogs may envelop both land and ocean; or both land and ocean may have a perfectly transparent atmosphere. The space allotted to this paper will not admit of going into an explanation of these climatic phenomena.

The Coast Range has large forests of timber, principally oak, redwood, and pine. The coniferæ do not form dense forests on the Sierras, below three thousand five hundred feet elevation, though the *Pinus sabiana* (Doug.) begins to appear much lower, in isolated individuals; sometimes in groves covering small hills, sometimes along the flanks of table mountains, and in sections where there are no summer rains. This is familiarly known as the Digger pine, having received its name from a tribe of Indians which depended, in a great measure, on its nuts for winter store of provisions. From three thousand feet elevation, and upwards, dense forests of other coniferæ cover the mountain hillsides, interrupted, however, by granite formations, which occupy more than two thirds of the mountain superficies. These magnificent forests in places are wholly obliterated, wherever saw-mills can be located, and a demand for lumber exists.

Reference to other reports to the State Board of Health will enable the reader to apply the general facts of topography herein stated, to matters pertaining to public health in California.

Geology teaches that the Sierra and the Coast Range Mountains belong to the cretaceous era. That time was, when the waves of the ocean laved their foothills, and but a few straggling and nude masses of rock marked the present line of the Pacific Coast.

Before geology was a science, this theory existed as a tradition, and it became crystallized in an historical shape in a map of California published in 1720, a copy of which is now in the archives of the Pioneer Society. It represents the Gulf of California extending northwesterly and covering the present valley of the Sacramento and San Joaquin, completely segregating the Coast Range formation from the continent.

From geological data, it is more than probable that at the period when a large portion of Arctic vegetation was in full vigor of life, the Sierras and the Coast Range Mountains had so recently emerged from the ocean that they were not adapted to modern forms of vegetable growth.

It is reasonable to suppose that on the oldest portion of the continent the

highest forms of plants have had their origin. The progress of vegetation may thus be traced along those lines which are now represented by the presence of coal formations and of lignite. There was no way by which forest trees and plants could cover the isolated Coast Range Mountains but from the far north of the continent.

That the Arctic region was a point of distribution of forest trees is supported by the theory that the miocene forests of Europe probably migrated from America from the above source, and not from Europe. Among such trees we have in California the willow, the oak, the sycamore, the walnut, the sequoia, and others.

The fact of the genus sequoia being of Arctic origin, and having but one species—*S. gigantea*—sparsely diffused through the Sierra Mountains, while the other species—*S. sempervirens*, or redwood—forms such immense forests throughout the middle portion of the Coast Range, may be attributed, in part, to the distinct climatal conditions which environ their habitats. The former is found in few localities, where rain seldom falls between the months of April and November, and where high summer temperature prevails. Altitude does not appear as an important factor in its history. Probably on account of the dry summer atmosphere, its propagation by seed is exceedingly limited. John Muir, however, states that in the Fresno grove he observed large numbers of saplings. Unlike the redwood, they do not propagate by suckers from decaying stumps, possibly because of the absence of surrounding moisture. Winter temperature, mild about its localities, interposes no check to its growth. The writer has never seen nor heard of a redwood tree growing on the eastern side of the great valley.

The redwood, on the other hand, covers large areas with forest growth, within thirty miles of the ocean, and stretches along a distance of two hundred miles or more, parallel with the seashore. Its vigorous and enormous growth, sometimes attaining a diameter of over thirty feet, and its wonderful power of propagation from buds, evolving from the ground line of fallen trees and stumps, show its perfect adaptation of environments to life. Proximity to the ocean protects it from the high temperature of the interior, while westerly winds and fogs, almost continuous for about eight months of the year, darkens its surrounding atmosphere, and give it, essentially, all the conditions of a primitive Arctic climate. Nor is its territory invaded by a solitary known specimen of the *gigantea*, though soil and climate are so admirably adapted to both species. Hence, to attribute the migration of the redwood from parallel ranges of the Sierras, does not appear to be logical; certain it is, that the seeds of the redwood, or of any other tree, would meet with great difficulties in crossing the broad valley between the Coast Range and the Sierras, especially if its genesis on the present habitat is to be referred to a period when the diffusion of plants by birds is to be partially or wholly excluded from such agency—a conclusion which is not improbable, since Lesquereux, in Hayden's Geological Report of the Territories, designates and figures seven species of sequoia as having been found in tertiary deposits.

Says Dr. Gray—respecting the distribution of tertiary plants in the Arctic, and in their relation to similar kinds in the Eastern United States and Asia—that the northern parts of America, Europe, and Asia were, during that age, under a common forest vegetation with a comparatively moderate climate. Herr estimates from the miocene plants of Greenland that the mean annual temperature of the Arctic regions in the middle tertiary was as high as 48 degrees F. John Muir, in his botanical notes on the cruise of the Corwin, remarks that there is so much resemblance between vegetation of the polar regions and the Alpine valleys of temperate zones, that the botanist on the coast of Arctic Siberia or America might readily fancy

himself on the Sierra Nevadas at a height of ten thousand to twelve thousand feet above the sea. The manner in which Arctic plants can adapt themselves to environments he tells in the fact that "the snow is universal during winter, and plants are solidly frozen and buried for nearly three fourths of the year. In this condition they enjoy a sleep and rest about as profound as death, from which they awake in June and July in vigorous health, and speedily reach a far higher development of leaf, and flower, and of fruit than is generally supposed."

The most satisfactory explanation of the manner in which forest growths may have been diffused through California is to be found in the action of glaciers. At the close of the tertiary, after high mountains had been elevated about the polar regions, the temperature became cooler, and gave origin to what is called the glacial age. These huge mountains of ice, starting from points where the snows of successive winters added to their volume, in breaking loose from their beds not only carried with them vast amounts of soil and drift, but uprooted forests and took them along by their irresistible momentum. Thus trees, plants, and seeds have been transported and left to germinate and grow in localities hundreds of miles and more from their primary habitat.

Illustrations of this force are not wanting along the mountain ranges of the Pacific Coast. The original and most reliable authority on the discovery, the formation, the life, and the transporting power, and the death of glaciers along this western shore of the continent is John Muir, whose publications from time to time have justly claimed the admiration and indorsement of the scientific world. He has demonstrated the possibility that the sequoia and other conifers and trees may have been transplanted in California from their Arctic habitat.

That many of our phanerogamous plants did not emigrate across the Rocky Mountains directly west, is apparent from the fact cited by Serena Watson, that of one thousand one hundred and forty-one species given in the list of the great basin of the Wasatch and the Uintas, 60 per cent are found on the Pacific slope and about the same proportion do not pass eastward beyond the Rocky Mountains. He furthermore states that a large proportion of Pacific species, not only arborescent, but shrubby and herbaceous, stop abruptly on the eastern slope of the Sierras and do not reappear eastward.

The deduction from foregoing statements is that many Arctic species of trees and plants must have been moved south as the glacial system worked its way along the line of tertiary deposits of the Pacific Coast. As previously stated, this was the view entertained by Professor Gray, and previously to his publication, by John Muir, who, after years of patient toil and investigation, first demonstrated the presence of living glaciers in California, in the face of repeated assertions by eminent geologists that no such formations were in existence.

There are other well known agents which effect the distribution of trees and plants, and though the subject would admit of much interesting discussion, the length of this article will preclude further remarks. When we consider that the present condition of the earth's surface has been the work of an indefinite period of time, and compare its former condition of incompatibility for life of any kind with its present state, when its fauna and flora teem with unnumbered forms, it is impossible to resist the conclusion, that in the future, as in the veiled history of the past, slow and rupturing revolutions will still progress; changing physical characters; modifying or destroying present types of existences; bringing forth new and more vigorous forms, and changing the physical aspects which belong to present races of men.

WEATHER REVIEW OF SACRAMENTO AND VARIOUS OTHER PORTIONS OF CALIFORNIA.

By Sergeant JAMES A. BARWICK, Observer Signal Corps, Sacramento, California.

The following meteorological data shows the general features of the weather for Sacramento, San Francisco, Red Bluff, and Los Angeles; also an article on the climate of Santa Barbara, as compared with Mentone and San Remo, two of the most prominent places on the Great Riviera of Italy; showing plainly what a fine climate, the year round, Santa Barbara has.

The table of mean temperature for the State of California was deduced from the Southern Pacific Railroad Company's records, and compiled from them by Sergeant Nelson Gorom, Observer Signal Corps, San Francisco.

The table of monthly rainfall was prepared under authority of Lieutenant J. E. Maxfield, Signal and Indications Officer for the Pacific Coast, San Francisco, by Francis Creighton, Observer Signal Corps.

A brief description of the various climates of California and of the Sacramento Valley will be found quite interesting. These articles were taken from the annual meteorological review of the State of California, and compiled by Sergeant James A. Barwick, Meteorologist to the State Agricultural Society.

GENERAL WEATHER REVIEW OF SACRAMENTO.

This city is geographically situated in latitude north $38^{\circ} 35'$; longitude west from Greenwich, $121^{\circ} 30'$; elevation above sea level, 35 feet; elevation of the zero point of the barometer cistern above sea level, 64 feet.

The following tabulated data show the general meteorological features of the weather of this city by seasons, winter, spring, summer, and autumn. Also, an annual review of the weather from 1878 to 1887.

COMPARATIVE WINTER WEATHER AT SACRAMENTO FROM 1877-78 TO 1887-88.

This table of winter comparisons shows the average, highest, lowest, and range of temperature; the average relative humidity and dew point; total precipitation; prevailing direction of the wind; total and maximum velocity, with the direction at the time of maximum velocity; total number of clear, fair, cloudy, and foggy days, and total number of days rain fell; number of snow storms; solar and lunar halos; light and killing frosts; and the number of days the temperature was below 32° .

WINTER OF:	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.	1883-84.	1884-85.	1885-86.	1886-87.	1887-88.
Average barometer	30.00	60.12	30.16	30.12	30.17	30.19	30.12	30.09	30.10	30.11	30.15
Highest barometer	30.38	30.51	30.68	30.46	30.52	30.74	30.58	30.43	30.40	30.51	30.83
Lowest barometer	29.46	29.77	29.47	29.48	29.75	29.68	29.42	29.49	29.32	29.54	29.50
Range of barometer	0.92	0.74	1.21	0.98	0.77	1.00	1.16	0.94	1.08	0.99	1.13
Average temperature	49.9	49.2	44.5	51.0	45.9	45.4	45.9	50.0	49.4	47.5	47.4
Highest temperature	67.0	73.5	64.0	67.0	62.8	71.7	71.0	70.0	72.7	67.0	75.0
Lowest temperature	27.0	23.5	25.0	35.0	29.0	22.0	21.0	27.0	27.5	30.0	19.0
Range of temperature	40.0	50.0	39.0	32.0	33.8	49.7	50.0	43.0	45.2	37.0	56.0
Average humidity	77.1	68.3	77.2	84.0	76.4	77.9	83.0	77.7	87.1	77.6	76.8
Average dew point					38.1	38.2	40.6	42.6	43.3	40.2	39.8
Prevailing wind	S.E.	N.	S.E.	S.E.	N.	S.E.	S.E.	N.W.	N.W.	S.E.	S.E.
Total precipitation	18.74	7.53	6.88	23.01	7.56	4.47	8.33	13.10	14.00	9.61	7.47
Total velocity of wind	13,452	12,650	13,735	16,092	14,611	11,131	12,294	16,406	13,889	14,003	13,944
Maximum velocity of wind	36	33	39	40	32	36	33	36	44	33	40
Direction at time of maximum velocity	S.E.	N.	S.	S.E.	N.	N.W.	S.	N.W.	S.E.	N.W.	S.E.
Clear days	26	44	39	14	46	52	47	40	42	41	44
Fair days	28	31	17	26	26	30	25	28	29	29	32
Cloudy days	36	15	35	50	18	8	19	23	19	20	15
Foggy days	0	0	6	6	5	4	8	0	7	0	0
Days rain fell	39	23	29	46	30	16	26	28	26	28	33
Snow storms	0	1	1	0	2	3	0	0	0	0	3
Solar halos	0	0	1	1	3	0	3	0	0	1	1
Lunar halos	0	0	3	2	1	0	2	0	1	0	0
Number of light frosts	9	15	11	11	27	19	5	25	8	10	5
Number of killing frosts	12	26	17	0	11	28	25	5	6	15	24
Number of days minimum temperature below 32°	5	17	17	0	5	23	11	4	4	4	15

COMPARATIVE SPRING WEATHER AT SACRAMENTO FROM 1878 TO 1888.

The following table shows the average, highest, lowest, and range of barometer; average, highest, lowest, and range of temperature; average relative humidity and dew point; total precipitation; prevailing directions, total, and maximum velocity of wind, with the direction at time of maximum velocity; total number of clear, fair, and cloudy days, and days that rain fell; solar and lunar halos; light and killing frosts; number of days the maximum temperature was above 90 degrees, and the minimum below 32 degrees:

SPRING OF:	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.
Average barometer	29.94	30.06	30.06	30.01	30.04	30.01	29.97	29.97	30.00	29.96	29.98
Highest barometer	30.39	30.33	30.36	30.41	30.38	30.43	30.30	30.37	30.35	30.27	30.48
Lowest barometer	29.56	29.73	29.55	29.68	29.71	29.62	29.51	29.52	29.63	29.65	29.64
Range of barometer	0.83	0.60	0.81	0.73	0.67	0.81	0.79	0.85	0.72	0.62	0.84
Average temperature	60.5	59.3	55.0	60.4	57.6	58.5	57.9	61.8	56.5	59.7	59.2
Highest temperature	91.0	91.0	86.0	88.8	94.6	98.0	85.0	98.0	94.0	98.0	90.0
Lowest temperature	40.0	38.0	29.0	37.0	34.1	39.8	39.0	39.0	37.7	39.0	37.0
Range of temperature	51.0	53.0	57.0	51.8	60.5	58.2	46.0	59.0	56.3	59.0	53.0
Average humidity	67.1	68.4	66.2	68.4	61.9	68.9	73.3	64.9	71.9	65.3	66.9
Average dew point					43.0	47.3	48.8	48.8	46.7	46.8	47.0
Prevailing wind	S.	S.E.	S.E.	S.	N.	S.	S.W.	S.W.	S.W.	N.W.	S.W.
Total precipitation	4.33	8.84	16.66	3.01	6.12	7.22	12.52	0.76	6.83	3.52	3.54
Total velocity of wind	13,962	14,530	19,653	14,968	17,774	15,825	18,168	16,670	17,759	17,211	16,810
Maximum velocity of wind	40	32	36	28	35	34	35	30	37	30	48
Direction at time of maximum velocity	N.	N.	N.	N.	N.	N.W.	S.	N.W.	N.W.	N.W.	S.E.
Clear days	45	39	49	60	57	54	46	58	50	61	59
Fair days	28	34	24	22	19	26	23	28	30	25	23
Cloudy days	19	19	19	10	16	12	23	6	12	6	10
Days rain fell	21	32	27	16	25	24	27	11	26	17	19
Solar halos	1	1	3	0	1	5	5	0	6	5	2
Lunar halos	0	0	1	0	2	0	3	0	2	0	2
Number of light frosts	2	2	3	5	6	2	10	4	4	3	0
Number of killing frosts	0	0	3	0	0	0	0	0	0	0	0
Number days maximum temperature above 90°	1	1	0	0	2	2	0	4	1	3	0
Number days minimum temperature below 32°	0	0	1	0	0	0	0	0	0	0	0

COMPARATIVE SUMMER WEATHER AT SACRAMENTO FROM 1878 TO 1888.

The tabulated meteorological data below shows the average, highest, lowest, and range of barometer; average, highest, lowest, and range of temperature; prevailing direction, total and maximum velocity of wind, with the direction at the time of maximum velocity; total number of clear, fair, and cloudy days, and number of days upon which rain fell; solar and lunar halos; light and killing frosts; total number of days maximum temperature was above 90°:

SUMMER OF:	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.
Average barometer	29.82	29.82	29.88	29.90	29.90	29.91	29.92	29.87	29.85	29.78	29.88
Highest barometer	30.12	30.08	30.19	30.14	30.10	30.20	30.14	30.12	30.06	30.06	30.21
Lowest barometer	29.63	29.62	29.58	29.70	29.72	29.63	29.73	29.64	29.65	29.50	29.63
Range of barometer	0.49	0.46	0.61	0.44	0.38	0.57	0.41	0.48	0.41	0.56	0.58
Average temperature	72.9	72.9	69.1	68.5	71.1	72.4	69.8	70.1	70.9	69.5	71.6
Highest temperature	100.5	103.0	98.0	98.6	99.8	103.5	100.0	105.0	105.0	100.0	107.5
Lowest temperature	49.0	51.0	49.0	48.0	51.2	49.8	52.9	51.5	51.5	47.0	48.5
Range of temperature	51.5	52.0	49.0	50.6	48.6	53.7	47.1	43.5	53.5	53.0	59.0
Average humidity	64.7	52.7	59.3	56.3	57.0	58.4	63.3	55.8	59.5	59.7	57.2
Average dew point					53.8	55.7	56.0	52.2	54.8	53.3	53.0
Prevailing wind	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.	S.
Total precipitation	.00	0.13	spring.	0.50	0.10	.00	1.45	0.11	.00	spring.	0.08
Total velocity of wind	13,303	13,645	16,066	16,531	15,449	15,609	16,518	18,474	14,917	16,465	15,625
Maximum velocity of wind	20	26	22	22	28	31	24	25	42	30	36
Direction at time of maximum velocity	N.W.	N.	S.	S.W.	N.W.	N.W.	S.W.	S.	N.W.	S.W.	S.W.
Clear days	83	81	85	86	87	89	77	81	91	86	77
Fair days	9	11	7	5	4	3	9	10	1	6	11
Cloudy days	0	0	0	1	1	0	6	1	0	0	4
Days rain fell	0	3	2	3	2	0	8	3	0	1	10
Solar halos	0	0	0	0	1	3	0	2	0	0	8
Lunar halos	0	0	0	0	0	0	0	0	0	0	0
Number days maximum temperature above 90°	30	38	12	16	32	34	21	30	35	31	40

COMPARATIVE AUTUMN WEATHER AT SACRAMENTO FROM 1877 TO 1887.

The comparative weather table below shows the average, highest, lowest, and range of barometer; average, highest, lowest, and range of temperature; average humidity and dew point; total precipitation; prevailing direction; total and maximum velocity of wind, with the direction at time of maximum velocity; total number of clear, fair, and cloudy days, and number of days rain fell; solar and lunar halos; light and killing frosts; number of days maximum temperature was above 90° and the minimum below 32°:

AUTUMN OF:	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.
Average barometer	29.97	29.99	30.00	30.04	30.08	30.02	30.01	30.00	29.93	30.01	29.91
Highest barometer	30.34	30.47	30.41	30.49	30.44	30.45	30.41	30.27	30.27	30.37	30.28
Lowest barometer	29.70	29.68	29.38	29.73	29.61	29.77	29.62	29.62	29.46	29.58	29.60
Range of barometer	0.64	0.79	1.03	0.76	0.83	0.68	0.79	0.65	0.81	0.79	0.68
Average temperature	63.4	62.5	60.9	59.9	58.5	58.8	60.1	60.0	62.8	58.5	63.9
Highest temperature	88.0	92.0	96.0	92.0	96.0	99.6	101.0	93.5	98.5	96.0	100.0
Lowest temperature	37.0	34.0	33.0	27.0	32.0	34.0	29.0	37.7	38.5	32.2	28.0
Range of temperature	51.0	58.0	63.0	65.0	64.0	65.6	72.0	55.8	60.0	63.8	72.0
Average humidity	54.3	54.4	65.2	54.9	58.4	69.6	68.8	69.1	66.3	64.5	54.0
Average dew point					42.4	47.5	48.7	49.0	49.2	45.1	44.9
Prevailing direction of wind	S.	N.	S.	N.	N.	N.W.	S.	N. S.E.	S.E.	N.W.	N.W.
Total precipitation	1.80	1.35	2.93	0.05	2.73	6.42	2.48	2.61	11.44	0.89	0.47
Total velocity of wind	10,669	11,268	10,492	11,518	12,963	12,213	10,771	10,659	14,214	10,635	11,866
Maximum velocity of wind	28	32	36	28	24	32	25	27	36	36	33
Direction at time of maximum velocity	N.W.	N.	N.	N.	N.	N.W.	N.W.	N.W.	S.E.	N.W.	N.W.
Clear days	76	71	59	71	73	61	67	75	51	78	74
Fair days	6	16	20	14	15	22	18	13	23	12	13
Cloudy days	9	4	12	6	3	8	6	3	17	1	3
Days rain fell	13	7	13	2	12	16	14	9	25	7	7
Solar halos	0	0	2	2	0	1	0	1	2	1	2
Lunar halos	1	0	2	0	0	0	0	4	0	0	0
Number of light frosts	3	6	5	4	11	26	19	17	3	20	5
Number of killing frosts	0	3	4	12	3	0	6	0	0	2	3
Number days maximum temperature above 90°	12	4	10	4	5	8	8	1	15	9	14
Number days minimum temperature below 32°	0	0	0	8	0	0	2	0	0	0	2

ANNUAL WEATHER SUMMARY AT SACRAMENTO FROM 1878 TO 1887, BOTH YEARS INCLUDED.

The following table shows the average, highest, lowest, and range of barometer; average, highest, lowest, and range of temperature; greatest and least monthly range of temperature; average maximum and minimum temperature, and the mean of the same; average relative humidity and dew point; total yearly precipitation; prevailing direction, total, and maximum velocity of wind, with the direction at time of maximum velocity; total number of clear, fair, cloudy, and foggy days, and the total number of days rain, snow, hail, and sleet fell; total number of earthquakes, snow storms, and storms with thunder and lightning; solar and lunar halos; light and killing frosts; total number of days maximum temperature was above 90°, and the minimum below 32°:

ANNUAL WEATHER REVIEW FOR:	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.
Average barometer	29.95	30.00	30.03	30.03	30.03	30.03	29.99	29.98	29.99	29.98
Highest barometer	30.51	30.68	30.49	30.46	30.52	30.74	30.68	30.43	30.51	30.46
Lowest barometer	29.46	29.38	29.48	29.61	29.71	29.62	29.42	29.46	29.32	29.45
Range of barometer	1.05	1.30	1.01	0.85	0.81	1.12	1.16	0.97	1.19	1.01
Average temperature	61.3	60.3	57.2	59.2	58.5	58.8	58.8	61.2	58.8	59.9
Highest temperature	100.5	103.0	98.0	98.8	99.8	103.5	100.0	105.0	105.0	100.0
Lowest temperature	23.5	25.0	25.0	31.9	27.0	22.0	21.0	34.2	27.5	28.0
Range of temperature	77.0	78.0	73.0	66.7	72.8	81.5	79.0	70.8	77.5	72.0
Greatest monthly range of temperature	50.0	49.0	49.0	46.7	55.2	55.8	46.0	58.0	52.8	58.7
Least monthly range of temperature	21.0	33.7	25.0	27.0	31.6	35.7	30.0	27.0	33.2	35.2
Average maximum temperature	81.5	83.7	80.0	81.6	82.0	84.3	70.0	73.2	71.5	72.9
Average minimum temperature	41.2	41.2	39.9	42.1	40.1	39.8	49.7	51.8	49.1	47.7
Mean of maximum and minimum temperature	61.4	62.4	59.9	61.8	61.0	62.0	59.8	62.5	60.3	60.3
Average range of temperature	40.3	42.5	40.1	39.5	41.9	44.5	38.8	40.7	42.6	46.2
Average humidity	62.2	65.7	64.6	66.7	66.0	69.0	70.7	67.8	70.1	63.7
Average dew point					45.7	47.3	48.5	48.8	47.8	46.0
Prevailing direction of wind	S.	S.	S.	S.	S.	S.	S.	S.	S.E.	N.W.
Total precipitation	23.45	22.37	31.99	20.71	18.06	13.48	34.92	20.72	18.17	13.43
Total velocity of wind	52,830	52,214	62,497	57,846	58,874	52,637	62,611	62,405	56,036	61,322
Maximum velocity of wind	40	39	40	32	35	36	36	36	44	40
Direction at time of maximum velocity	N.	S.	S.E.	S.E.	N.	N.W.	N.W.	S.E.	S.E.	S.E.
Total number of clear days	234	208	237	251	249	263	239	227	262	267
Total number of fair days	75	99	59	69	76	76	68	88	78	74
Total number of cloudy days	56	58	70	45	40	26	59	50	27	24
Total number of foggy days	0	4	5	8	1	11	0	0	4	0
Total number of days of precipitation	66	79	70	67	70	54	76	62	57	56
Number of earthquakes	2	0	0	1	0	0	0	2	1	1
Snow storms	0	1	1	0	3	2	0	0	0	0
Thunder and lightning	4	4	3	4	4	2	2	6	3	2
Annual number of solar halos	1	3	6	2	5	8	9	4	8	8
Annual number of lunar halos	0	2	4	2	3	0	9	1	2	0
Annual number of light frosts	18	17	14	34	69	33	31	24	30	18
Annual number of killing frosts	22	27	32	4	12	40	22	0	10	26
Total number of days maximum temperature was above 90°	35	48	16	22	42	44	21	48	40	46
Total number of days minimum temperature was below 32°	15	14	17	1	5	27	13	0	4	9

MEAN AVERAGE WINTER TEMPERATURE IN SACRAMENTO.

The tabulated statement below shows the average temperature for the winter months, and for the season also. The winter seasons, beginning with the season of 1853-54, and ending with the one of 1887-88; giving a mean average for the thirty-five years. Judging from the average temperature for each season, we must conclude that the season of 1879-80 was the coldest, 45.5°; and the warmest that of 1881, 51.0°; the mean average of the thirty-five years being 48.3°:

WINTER SEASON OF—	Mean Temp.— December.	Mean Temp.— January.	Mean Temp.— February.	Mean Winter Temperature.
1853-54.....	48.0	43.0	51.0	47.3
1854-55.....	47.9	43.7	52.5	48.0
1855-56.....	46.0	48.0	52.8	48.9
1856-57.....	43.9	48.5	50.2	47.5
1857-58.....	47.4	45.0	52.2	48.2
1858-59.....	44.5	44.9	50.5	46.6
1859-60.....	43.5	46.2	49.8	46.5
1860-61.....	49.3	47.1	52.2	49.5
1861-62.....	50.9	46.4	47.5	48.3
1862-63.....	46.4	46.9	48.0	47.1
1863-64.....	46.5	49.2	53.6	49.8
1864-65.....	50.2	47.4	49.0	48.9
1865-66.....	44.1	46.5	63.5	51.4
1866-67.....	50.2	48.2	47.8	48.7
1867-68.....	46.8	47.0	50.5	48.1
1868-69.....	47.0	47.6	49.9	48.2
1869-70.....	46.5	48.6	51.1	48.7
1870-71.....	45.5	48.3	49.4	47.7
1871-72.....	48.7	48.5	53.3	50.2
1872-73.....	49.0	52.7	48.2	50.0
1873-74.....	47.7	45.7	49.3	47.6
1874-75.....	45.0	46.9	52.7	48.2
1875-76.....	48.0	48.8	50.2	49.0
1876-77.....	45.5	49.1	55.0	49.9
1877-78.....	48.6	49.7	51.3	49.9
1878-79.....	47.2	45.5	55.0	49.2
1879-80.....	44.0	43.5	46.0	44.5
1880-81.....	50.3	49.2	53.5	51.0
1881-82.....	46.2	45.1	46.3	45.9
1882-83.....	48.2	41.9	46.0	45.4
1883-84.....	44.2	46.6	46.9	45.9
1884-85.....	48.8	47.1	54.0	50.0
1885-86.....	49.1	45.7	53.3	49.4
1886-87.....	49.2	48.5	44.7	47.5
1887-88.....	46.9	42.8	52.6	47.4
Totals	1651.2	1639.8	1779.6	1680.4
Averages for 35 years	47.2	46.9	50.8	48.3

MEAN AVERAGE SPRING TEMPERATURE IN SACRAMENTO.

The table below will be found to contain the average temperature for the Spring months, also for the season. The warmest one, as indicated by its average temperature, was 1853, 62.9°; the coldest, 1880, 55.0°; the mean average Spring temperature being 59.4°:

SPRING SEASON OF—	Mean Temp.— March.	Mean Temp.— April.	Mean Temp.— May.	Mean Spring Temperature.
1853	59.8	61.0	68.0	62.9
1854	53.0	60.0	62.0	58.3
1855	54.8	58.1	60.2	57.7
1856	57.0	58.8	63.9	59.9
1857	56.4	63.3	65.5	61.7
1858	53.7	59.8	65.2	59.6
1859	51.5	57.1	63.0	57.2
1860	53.3	57.8	58.5	56.5
1861	55.0	60.6	63.7	59.8
1862	53.6	58.0	61.2	57.6
1863	57.6	59.5	67.1	61.4
1864	56.1	62.1	68.5	62.2
1865	53.6	59.3	70.2	61.0
1866	54.2	61.9	63.1	59.7
1867	50.7	59.7	64.4	58.3
1868	55.0	60.1	64.2	59.8
1869	53.6	59.0	64.2	58.9
1870	53.0	57.0	61.0	57.0
1871	56.0	59.2	61.5	58.9
1872	56.8	57.6	67.0	60.5
1873	56.8	60.0	67.9	61.6
1874	52.9	59.5	64.7	59.0
1875	58.7	63.0	68.1	63.3
1876	54.6	59.5	65.7	59.9
1877	59.0	60.2	64.5	61.2
1878	56.7	59.4	65.5	60.5
1879	57.4	60.3	60.2	59.3
1880	48.8	54.6	61.6	55.0
1881	55.5	60.9	64.8	60.4
1882	53.0	55.8	64.0	57.6
1883	56.9	56.0	62.8	58.5
1884	52.9	56.7	64.0	57.9
1885	59.1	60.6	65.7	61.8
1886	52.1	55.5	62.0	56.5
1887	57.8	58.3	62.9	59.7
1888	53.6	62.3	61.8	59.2
Totals	1980.5	2132.5	2308.4	2140.3
Averages for 36 years	55.0	59.2	64.1	59.4

MEAN AVERAGE SUMMER TEMPERATURE IN SACRAMENTO.

The average temperature in the following table is for the summer months and for the summer season, showing by their average temperature that 1866 was the warmest, 74.8°; and the coldest to have been 1881, 68.5°; the mean average for thirty-six years is 71.6°; the season of 1866 being 3.2° above the mean average, and 1881 3.1° below the mean average for the past thirty-six years:

SUMMER SEASON OF—	Mean Temp.— June.	Mean Temp.— July.	Mean Temp.— August.	Mean Summer Temperature.
1853.....	77.0	75.0	71.0	74.3
1854.....	67.0	80.6	69.5	72.4
1855.....	71.1	72.5	73.0	72.2
1856.....	71.1	75.1	69.6	71.9
1857.....	71.9	71.4	71.3	71.5
1858.....	69.4	70.8	70.6	70.3
1859.....	74.8	69.1	67.2	70.4
1860.....	65.6	73.2	73.5	70.8
1861.....	66.2	73.6	69.7	69.8
1862.....	69.3	73.2	75.0	72.5
1863.....	69.1	75.6	70.7	71.8
1864.....	71.1	74.8	74.7	73.5
1865.....	73.5	74.0	71.7	73.1
1866.....	72.2	76.2	76.0	74.8
1867.....	70.3	73.7	71.7	71.9
1868.....	69.5	73.8	71.2	71.5
1869.....	70.8	74.3	71.3	72.1
1870.....	69.3	71.8	72.6	71.2
1871.....	70.1	70.2	72.0	70.8
1872.....	69.2	71.4	73.1	71.6
1873.....	71.7	73.2	66.3	70.4
1874.....	70.2	72.8	70.9	71.3
1875.....	70.6	73.3	72.5	72.1
1876.....	76.9	74.0	72.8	74.6
1877.....	72.5	75.0	72.9	73.5
1878.....	71.8	73.4	73.4	72.9
1879.....	72.1	71.8	74.7	72.9
1880.....	66.6	70.9	69.7	69.1
1881.....	66.2	71.1	68.2	68.5
1882.....	68.1	73.4	71.9	71.1
1883.....	72.6	73.1	71.4	72.4
1884.....	65.8	71.2	72.5	69.8
1885.....	66.2	71.0	73.0	70.1
1886.....	69.0	72.0	71.6	70.9
1887.....	69.1	70.2	69.1	69.5
1888.....	67.7	71.6	75.4	71.6
Totals	2525.6	3628.3	2581.7	2578.6
Averages for 36 years	70.2	73.0	71.7	71.6

MEAN AVERAGE AUTUMN TEMPERATURE IN SACRAMENTO.

The average temperature for the fall season indicates the fall of 1853 as being the warmest, 69.0°; that of 1881 and 1886 were the coldest, judging from the average temperature, 58.5°. The average mean temperature for thirty-five years past was 61.6°, showing the average of 1853 to have been 7.4° above the mean average, and that of 1881 and 1886 to have been 3.1° below the mean average temperature for the past thirty-five years:

FALL SEASON OF—	Mean Temp.— September.	Mean Temp.— October.	Mean Temp.— November.	Mean Autumn Temperature.
1853.....	76.0	78.0	53.0	69.0
1854.....	65.0	60.0	55.0	60.0
1855.....	68.0	63.0	50.6	60.5
1856.....	70.9	58.0	52.2	60.4
1857.....	67.9	61.5	53.2	60.9
1858.....	68.9	59.5	54.2	60.9
1859.....	65.9	63.3	54.0	61.1
1860.....	67.6	59.8	53.5	60.3
1861.....	67.8	59.9	53.6	60.4
1862.....	70.4	67.6	53.1	63.7
1863.....	69.0	62.8	52.7	61.5
1864.....	69.8	64.5	53.5	62.6
1865.....	68.8	63.1	56.9	62.9
1866.....	72.2	65.2	53.8	63.7
1867.....	68.8	62.7	54.8	62.1
1868.....	68.3	62.0	53.9	61.4
1869.....	69.9	63.1	54.0	62.3
1870.....	68.0	63.6	53.4	61.7
1871.....	67.4	62.2	50.2	59.9
1872.....	68.8	58.9	51.2	59.6
1873.....	69.9	61.4	57.5	62.9
1874.....	70.7	61.7	53.9	62.1
1875.....	65.7	60.9	56.7	64.1
1876.....	70.1	63.5	53.3	62.3
1877.....	72.8	62.9	54.7	63.5
1878.....	69.0	62.9	55.5	62.5
1879.....	70.5	61.5	50.9	61.0
1880.....	68.0	62.1	49.7	59.9
1881.....	67.8	56.8	50.8	58.5
1882.....	68.4	58.4	49.5	58.8
1883.....	71.6	58.2	50.5	60.1
1884.....	64.8	59.9	55.3	60.0
1885.....	69.8	64.3	54.4	62.8
1886.....	67.9	57.1	50.4	58.5
1887.....	70.4	66.5	54.7	63.9
Totals	2416.8	2185.8	1864.6	2155.8
Averages for 35 years	69.1	62.5	53.3	61.6

AVERAGE ANNUAL AND SEASONAL TEMPERATURE IN SACRAMENTO.

The statement below shows the average temperature, for each year, for thirty-five years; spring and summer for thirty-six years, and autumn and winter for thirty-five years. The coldest year, inferring from the average temperature, was that of 1880, 57.2°; the warmest was 1864, 62.8°; the mean average for the past thirty-five years, 60.2°, showing the coldest to have been 3° below the mean average, while the warmest year was that of 1864, when it was 2.6° above the mean average for thirty-five years. By careful study of the table, there will be noticed but a slight difference between the coldest and the warmest year, as compared with a thirty-five years' average, generally not more than 3°. Therefore, we might safely say that the average temperature of any year is not likely to vary more than 3° from 60° either way, between the hottest and coldest year, as compared with the mean average temperature for the past thirty-five years:

YEAR.	Mean Annual Temperature.	Mean Spring Temperature.	Mean Summer Temperature.	Mean Autumn Temperature.	Mean Winter Temperature.	
1853.....	62.6	62.9	74.3	69.0	1853-54.....	47.3
1854.....	59.5	58.3	72.4	60.0	1854-55.....	48.0
1855.....	59.5	57.7	72.2	60.5	1855-56.....	48.9
1856.....	60.1	59.9	71.9	60.4	1856-57.....	47.5
1857.....	60.7	61.7	71.5	60.9	1857-58.....	48.2
1858.....	59.5	59.8	70.3	60.9	1858-59.....	46.6
1859.....	58.7	57.2	70.4	61.1	1859-60.....	46.5
1860.....	59.0	56.5	70.8	60.3	1860-61.....	49.5
1861.....	60.1	59.8	69.8	60.4	1861-62.....	48.3
1862.....	62.2	57.6	72.5	63.7	1862-63.....	47.1
1863.....	60.3	61.4	71.8	61.5	1863-64.....	49.8
1864.....	62.8	62.2	73.5	62.6	1864-65.....	48.9
1865.....	61.0	61.0	73.1	62.9	1865-66.....	51.4
1866.....	62.1	59.7	74.8	63.7	1866-67.....	48.7
1867.....	59.9	58.3	71.9	62.1	1867-68.....	48.1
1868.....	60.1	59.8	71.5	61.4	1868-69.....	48.2
1869.....	60.4	58.9	72.1	62.3	1869-70.....	48.7
1870.....	59.6	57.0	71.2	61.7	1870-71.....	47.7
1871.....	59.6	58.9	70.8	59.9	1871-72.....	50.2
1872.....	60.4	60.5	71.6	59.6	1872-73.....	50.0
1873.....	60.7	61.6	70.4	62.9	1873-74.....	47.6
1874.....	59.8	59.0	71.3	62.1	1874-75.....	48.2
1875.....	62.5	63.3	72.1	64.1	1875-76.....	49.0
1876.....	61.7	59.9	74.6	62.3	1876-77.....	49.9
1877.....	61.2	61.2	73.5	63.4	1877-78.....	49.9
1878.....	61.3	60.5	72.9	62.5	1878-79.....	49.2
1879.....	60.3	59.3	72.9	60.9	1879-80.....	44.5
1880.....	57.2	55.0	69.1	59.9	1880-81.....	51.0
1881.....	59.2	60.4	68.5	58.5	1881-82.....	45.9
1882.....	58.5	57.6	71.1	58.8	1882-83.....	45.4
1883.....	58.8	58.5	72.4	60.1	1883-84.....	45.9
1884.....	58.8	57.9	69.8	60.0	1884-85.....	50.0
1885.....	61.2	61.8	70.1	62.8	1885-86.....	49.4
1886.....	58.8	56.5	70.9	58.5	1886-87.....	47.5
1887.....	59.9	59.7	69.5	63.9	1887-88.....	47.4
1888.....	.....	59.2	71.6	.....	.....	.....
Totals	2106.0	2140.3	2578.6	2155.8	.....	1690.4
Averages for 35 years	60.2	*59.5	*71.6	61.6	.....	48.3

* Average for thirty-six years.

DAILY NORMAL TEMPERATURE FOR SACRAMENTO.

The following table of normal temperatures for each day of each month, at Sacramento, California, as deduced from three daily observations for nine years, from July, 1877, to December, 1885, inclusive, was prepared at the Chief Signal Office, Washington, D. C., by authority of the Chief Signal Officer:

DATE.	*Jan.	*Feb.	*Mar.	*April.	*May.	*June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	44.2	49.4	55.8	57.7	61.6	69.2	72.3	73.1	73.0	62.3	57.2	50.6
2	45.6	49.5	55.5	58.0	61.7	69.2	71.4	74.0	72.4	62.7	55.6	50.6
3	45.3	49.0	54.0	56.5	62.6	68.8	70.8	73.2	72.5	63.6	*56.5	49.6
4	45.5	49.7	53.4	+57.7	61.2	68.5	71.2	71.9	73.4	64.0	55.5	50.2
5	47.2	48.0	54.8	58.0	61.5	69.4	71.4	72.8	71.8	63.7	56.2	50.6
6	45.9	47.6	54.4	58.3	61.6	68.2	71.5	73.7	69.9	62.7	56.6	49.4
7	46.7	46.0	53.9	58.4	61.4	67.9	70.7	73.9	70.3	62.9	56.9	47.7
8	47.6	47.1	53.7	60.1	62.5	67.2	70.5	74.8	71.5	*62.5	56.2	45.9
9	45.8	47.1	53.7	58.8	61.4	67.5	71.0	75.4	70.8	63.0	55.0	46.1
10	45.9	+48.4	53.0	57.6	62.0	66.1	72.8	74.8	70.9	61.8	53.3	46.1
11	43.9	46.8	53.3	57.3	61.4	+65.7	74.4	74.3	69.9	61.1	52.1	46.4
12	42.7	46.2	53.4	56.6	59.4	68.2	75.4	72.5	70.4	58.7	51.7	45.3
13	43.6	48.1	53.2	56.2	59.9	68.5	74.0	72.0	70.8	57.0	52.0	44.7
14	45.7	47.9	54.1	56.8	59.2	68.3	74.1	72.8	70.4	56.6	53.0	45.7
15	44.6	47.3	54.0	46.5	60.4	67.8	71.5	73.3	70.3	58.6	52.3	47.8
16	45.9	48.8	54.8	55.4	60.4	68.4	73.0	*72.1	68.3	58.9	52.5	47.3
17	46.0	48.9	53.5	54.7	61.5	69.3	72.5	71.5	68.0	60.9	50.5	47.3
18	+45.5	49.7	53.4	56.4	64.0	69.2	70.6	72.9	67.6	61.4	50.1	49.2
19	45.4	50.1	54.0	54.4	65.8	68.6	71.0	71.7	67.5	62.2	50.2	48.6
20	45.7	50.3	55.5	55.4	64.7	68.8	72.5	69.5	68.3	61.3	50.5	47.2
21	45.8	51.2	56.2	57.5	64.0	68.4	73.2	69.2	69.6	61.4	51.0	48.7
22	+47.4	51.9	57.0	58.2	63.8	67.2	73.6	69.5	69.5	60.9	50.7	48.7
23	47.4	53.1	56.5	58.3	64.8	69.2	74.5	69.4	67.3	60.5	50.9	48.0
24	48.0	53.4	56.4	60.1	66.3	68.8	73.3	69.3	66.4	61.0	50.4	49.3
25	47.4	54.9	57.0	58.5	66.9	70.5	71.8	69.7	66.4	61.3	48.5	48.2
26	45.8	54.8	56.4	58.1	67.0	71.5	71.3	69.6	66.7	59.7	48.3	47.2
27	46.3	55.0	+58.4	61.0	67.8	70.5	72.7	69.9	67.1	60.0	48.7	46.7
28	47.1	54.7	56.5	62.7	68.5	68.8	72.3	69.5	66.3	59.7	48.9	46.1
29	48.0	.....	57.6	62.7	69.0	69.6	71.7	70.1	65.1	56.6	50.1	44.1
30	48.2	.....	57.2	52.6	68.9	71.5	72.5	71.7	63.1	58.1	50.4	43.5
31	49.4	.....	57.1	.....	69.0	.....	72.4	72.7	.....	56.9	.....	42.6
Monthly	46.1	49.9	55.1	58.0	63.6	68.7	72.3	72.0	69.2	60.8	52.4	47.4

* Means for eight years.

† Means for seven years.

MONTHLY NORMAL TEMPERATURE FOR SACRAMENTO.

The following normal temperatures for each month of the year, for Sacramento, from 1853 to 1887, inclusive—periods of thirty-five and thirty-six years. This table gives the general average temperature for each month, and the annual average, which is termed the normal temperature of a place, in this case being Sacramento, and calculated from three daily observations:

NORMAL TEMPERATURE OF THIRTY-FIVE AND THIRTY-SIX YEARS.

	Degrees.		Degrees.
January—thirty-five years	47.0	August—thirty-six years	71.6
February—thirty-five years	50.8	September—thirty-five years	69.1
March—thirty-six years	55.0	October—thirty-five years	62.5
April—thirty-six years	59.2	November—thirty-five years	53.3
May—thirty-six years	64.1	December—thirty-five years	47.2
June—thirty-six years	70.2	Yearly—thirty-five years	60.2
July—thirty-six years	73.0		

	Degrees.
Normal winter temperature of thirty-five years.....	48.3
Normal spring temperature of thirty-six years.....	59.4
Normal summer temperature of thirty-six years.....	71.6
Normal autumn temperature of thirty-five years.....	61.6
Normal yearly temperature of thirty-five years.....	60.2

RAINFALL FOR SPRING, SUMMER, AUTUMN, WINTER, AND TOTAL FOR EACH YEAR, AT SACRAMENTO.

The following table gives the rainfall for each season of spring, summer, autumn, and winter; also the total rainfall for each year and for each season. The table shows the annual rainfall for each year, beginning with the year 1850, and the total for each season, beginning with that of 1849-50. The rainfall for the winter seasons begins with the winter of 1849-50, and ends with the winter of 1887-88—making a total of thirty-nine winters:

YEAR.	Rainfall for Spring.	Rainfall for Summer.	Rainfall for Autumn.	Rainfall for Winter.	Annual Rainfall.	Season of—	Inches.
1849			4.00		*16.50	1849-50	36.00
1850	14.50	none	sprinkle	17.80	19.50	1850-51	4.71
1851	3.71	none	3.32	1.00	15.10	1851-52	17.98
1852	6.89	none	6.00	7.77	27.00	1852-53	36.36
1853	11.95	sprinkle	1.50	18.41	19.99	1853-54	20.06
1854	4.96	.31	1.66	13.29	19.83	1854-55	18.62
1855	9.67	.01	.75	7.28	18.56	1855-56	13.76
1856	5.37	.03	.85	7.61	14.26	1856-57	10.46
1857	.68	.35	3.06	8.58	12.91	1857-58	14.99
1858	4.29	.11	3.16	7.53	16.80	1858-59	16.04
1859	3.66	none	6.50	9.21	16.86	1859-60	22.06
1860	10.47	.05	1.15	5.07	19.19	1860-61	16.18
1861	4.39	.69	2.17	9.87	21.38	1861-62	36.10
1862	5.43	.02	.36	27.44	27.44	1862-63	11.59
1863	4.41	none	1.49	6.81	12.20	1863-64	7.79
1864	3.12	.17	6.84	3.09	19.27	1864-65	22.59
1865	2.31	sprinkle	2.99	13.36	11.15	1865-66	17.91
1866	4.75	.12	2.43	10.07	26.52	1866-67	25.32
1867	2.82	none	3.82	20.05	30.03	1867-68	32.70
1868	6.93	sprinkle	.77	22.04	19.50	1868-69	16.64
1869	4.83	.01	2.97	11.03	18.19	1869-70	13.57
1870	4.03	sprinkle	.60	6.57	10.21	1870-71	8.47
1871	2.90	sprinkle	1.43	4.97	19.32	1871-72	24.05
1872	2.83	.02	2.15	19.47	19.17	1872-73	14.19
1873	1.06	.02	1.52	11.08	18.20	1873-74	22.92
1874	4.31	sprinkle	6.11	17.07	17.92	1874-75	17.70
1875	.80	1.10	6.64	9.69	23.31	1875-76	26.31
1876	5.40	.23	3.75	14.26	18.12	1876-77	9.19
1877	1.39	.01	1.80	3.81	8.44	1877-78	24.86
1878	4.33	none	1.35	18.73	23.45	1878-79	17.85
1879	8.84	.13	2.93	7.53	22.37	1879-80	26.47
1880	16.66	sprinkle	.05	6.88	31.99	1880-81	26.57
1881	3.01	.50	2.73	23.01	20.71	1881-82	16.51
1882	6.12	.10	6.42	7.56	18.06	1882-83	18.11
1883	7.22	none	2.48	4.47	13.48	1883-84	24.78
1884	12.52	1.45	2.61	8.33	34.92	1884-85	16.58
1885	.76	.11	11.44	13.10	20.72	1885-86	32.27
1886	6.83	none	.89	14.00	18.17	1886-87	13.97
1887	3.52	sprinkle	.47	9.61	13.43	1887-88	11.56
1888	3.54	.08		7.47			
Totals	211.21	5.62	111.16	435.12	738.67		763.88
Averages	†5.416	†0.144	†2.850	†11.157	†19.439		†19.587

* Rainfall for September, October, November, and December, 1849.

† Average for 39 years. ‡ Average for 38 years.

HIGHEST, LOWEST, AND AVERAGE TEMPERATURE, WITH PREVAILING WIND, AT SACRAMENTO.

The following table shows the highest, lowest, and average yearly temperature, along with the prevailing direction of wind, for each year. This data is from the records of Dr. Thomas M. Logan, the railroad company, Mr. Samuel H. Gerrish, and the records of the United States Signal Office. The records cover a period of thirty-six years. It shows that a very low temperature is never recorded at this point. Often several years will intervene without the temperature falling to the freezing point. The lowest recorded temperature is 19°, in January, 1854, and January, 1888; the highest 108°, on August 24, 1888. The prevailing direction of wind for the year is usually from the south.

YEAR.	Highest Temperature.	Lowest Temperature.	Average Annual Temperature.	Prevailing Direction of Wind for Each Year.
1853.....	97	32	62.6	N.W.
1854.....	102	19	59.5	N.W.
1855.....	100	25	59.5	N.W.
1856.....	100	32	60.1	S.E.
1857.....	98	31	60.7	S.E.
1858.....	97	29	59.5	S.
1859.....	96	34	58.7	S.
1860.....	90	37	59.0	S.
1861.....	87	36	60.1	S.
1862.....	94	32	62.2	N.W.
1863.....	95	34	60.3	N.W.
1864.....	96	34	62.8	S.E.
1865.....	94	31	61.0	S.E.
1866.....	98	33	62.1	S.E.
1867.....	99	28	59.9	S.
1868.....	100	30	60.1	S.
1869.....	102	31	60.4	S.
1870.....	106	21	59.6	S.
1871.....	102	30	59.6	S.
1872.....	100	26	60.4	N.
1873.....	105	31	60.7	S.
1874.....	96	33	59.8	S.
1875.....	100	33	62.5	S.
1876.....	98	30	61.7	S.
1877.....	103	31	61.2	S.
1878.....	101	24	61.3	S.
1879.....	103	25	60.3	S.
1880.....	98	25	57.2	S.
1881.....	99	32	59.2	S.
1882.....	100	27	58.5	S.
1883.....	104	22	58.8	S.
1884.....	100	21	58.8	S.
1885.....	105	34	61.2	S.
1886.....	105	28	58.8	S.E.
1887.....	100	28	59.9	N.W.
1888.....	*108	19	-----	S.

* Up to September 1, 1888.

Highest temperature in 36 years, 108°—on August 24, 1888.

Lowest temperature in 36 years, 19°—in January, 1854, and 19° in January, 1888.

Average annual temperature for 35 years, 60.2°.

General prevailing direction of wind—from the south.

RAINFALL OF SACRAMENTO FROM SEPTEMBER, 1849, TO SEPTEMBER, 1888.

The following table of rainfall, from September, 1849, to September 1, 1888, was collected from the records of Dr. T. M. Logan, Dr. F. W. Hatch, and those of the United States Signal Service:

YEAR.	January	February	March	April	May	June	July	August	September	October	November	December	Total for Year	Season of	Inches
1849									.25	1.50	2.25	12.50		1849-50	36.00
1850	4.50	.50	10.00	4.25	.25	none	none	none	none	none	spring.	spring.	19.50	1850-51	4.71
1851	.65	.35	1.88	1.14	.69	none	none	none	1.00	.18	2.14	7.07	15.10	1851-52	17.98
1852	.58	.12	6.40	.19	.30	none	none	none	none	spring.	none	6.00	13.41	1852-53	36.36
1853	3.00	2.00	7.00	3.50	1.45	spring.	spring.	none	spring.	spring.	1.50	1.54	19.99	1853-54	20.06
1854	3.25	8.50	3.25	1.50	.21	.31	none	spring.	spring.	1.01	.85	1.15	19.83	1854-55	18.62
1855	2.67	3.46	4.20	4.32	1.16	.01	none	none	spring.	none	.75	2.00	18.56	1855-56	13.76
1856	4.92	.69	1.40	2.13	1.84	.03	none	none	spring.	.20	.85	2.40	14.26	1856-57	10.46
1857	1.38	4.80	.68	spring.	spring.	.35	none	spring.	none	.66	2.41	2.63	12.91	1857-58	15.00
1858	2.44	2.46	2.88	1.21	.20	.10	.01	spring.	spring.	3.01	.15	4.34	16.80	1858-59	16.03
1859	.96	3.91	1.64	.98	1.04	none	none	none	.02	none	6.48	1.83	16.86	1859-60	22.09
1860	2.31	.93	5.11	2.87	2.49	.02	.63	none	.06	.91	.18	4.28	19.19	1860-61	16.10
1861	2.67	2.92	3.32	.48	.59	.14	.55	none	none	spring.	2.17	8.64	21.38	1861-62	35.56
1862	15.04	4.26	2.80	.82	1.81	.01	none	.01	none	.36	spring.	2.33	27.44	1862-63	11.58
1863	1.73	2.75	2.36	1.69	.36	none	none	none	spring.	none	1.49	1.82	12.20	1863-64	7.87
1864	1.08	.19	1.30	1.08	.74	.09	none	.08	spring.	.12	6.72	7.87	19.27	1864-65	22.51
1865	4.78	.71	.48	1.37	.48	none	spring.	none	.08	.48	2.43	.36	11.15	1865-66	17.93
1866	7.70	2.01	2.02	.48	2.25	.10	.02	none	none	spring.	2.43	9.51	26.52	1866-67	25.30
1867	3.44	7.10	1.01	1.80	.01	none	none	none	.01	none	3.81	12.85	30.03	1867-68	32.79
1868	6.04	3.15	4.35	2.31	.37	spring.	none	none	none	none	.77	2.61	19.50	1868-69	16.64
1869	4.79	3.63	2.94	1.24	.65	.01	none	none	spring.	2.12	.85	1.96	18.19	1869-70	13.57
1870	1.37	3.24	1.64	2.12	.27	spring.	spring.	spring.	none	.02	.58	.97	10.21	1870-71	8.47
1871	2.08	1.92	.69	1.45	.76	spring.	none	none	spring.	.21	1.22	10.59	18.92	1871-72	23.65
1872	4.04	4.74	1.94	.61	.28	.02	none	none	spring.	.22	1.93	5.39	19.17	1872-73	14.21
1873	1.23	4.36	.55	.51	none	spring.	.02	spring.	none	.31	1.21	10.01	18.20	1873-74	22.90
1874	5.20	1.86	3.05	.89	.37	spring.	spring.	none	.06	2.26	3.80	.44	17.92	1874-75	17.70
1875	8.70	.55	.80	spring.	spring.	1.10	none	none	none	.44	6.20	5.52	23.31	1875-76	26.53
1876	4.99	3.75	4.15	1.10	.15	.06	.21	.02	spring.	3.45	.30	none	18.12	1876-77	8.96
1877	2.77	1.04	.56	.19	.04	.01	spring.	spring.	none	.73	1.07	1.43	8.44	1877-78	24.98
1878	9.26	8.04	3.09	1.07	.17	none	none	none	.29	.55	.51	.47	23.45	1878-79	17.85
1879	3.18	3.88	4.88	2.66	1.30	.13	spring.	spring.	none	.88	2.05	3.41	22.37	1879-80	26.47
1880	1.64	1.83	1.70	14.20	.76	none	spring.	none	none	none	.05	11.31	31.99	1880-81	26.57
1881	6.14	5.06	1.37	1.64	spring.	.50	spring.	none	.30	.55	1.88	3.27	20.71	1881-82	16.51
1882	1.89	2.40	3.78	1.99	.35	.10	spring.	none	.57	2.63	3.22	1.13	18.06	1882-83	18.11
1883	2.23	1.11	3.70	.67	2.85	none	none	none	.90	.96	.61	.44	13.48	1883-84	24.78
1884	3.43	4.46	8.14	4.32	.06	1.45	none	spring.	.80	2.01	none	10.45	34.92	1884-85	16.58
1885	2.16	.49	.08	.68	spring.	.11	spring.	none	.02	11.34	5.76	20.72	1885-86	32.27	
1886	7.95	.29	2.68	4.06	.07	none	none	none	none	.68	.21	2.21	18.17	1886-87	13.97
1887	1.12	6.28	.94	2.53	spring.	none	none	spring.	.02	none	.45	2.09	13.43	1887-88	7.94
1888	4.81	.57	3.04	.10	.40	.08	spring.	none	-----	-----	-----	-----	-----	1888-89	*spring
Totals	148.12	110.31	111.80	74.17	26.19	4.67	1.14	.11	4.23	26.48	80.46	178.49	738.67	-----	763.88
Average	3.798	2.828	4.867	1.902	0.672	0.120	0.029	.003	1.06	.690	2.063	4.562	19.439	-----	19.587

* Up to September 1, 1888.

MONTHLY AND ANNUAL MEAN TEMPERATURES

(In degrees Fahrenheit) at Points in California, during Year ending June 30, 1887.

Prepared by SERGEANT NELSON GOROM, Observer Signal Corps, San Francisco, California.

PLACE.	1886.						1887.						Mean.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	
Almaden					55.7	51.4	50.7	47.1	56.5	56.5	62.6	68.2	56.4
Anaheim	72.3	76.6	71.5	66.1	60.5	56.9	54.0	53.3	58.9	61.0	63.4	65.8	63.3
Antioch	78.3	74.5	67.6	62.2	52.6	52.4	49.8	47.1	59.0	62.3	68.2	73.6	62.4
Aptos	61.4	61.9	60.9	55.1	51.6	53.1	49.1	47.0	55.5	55.7	58.9	63.4	56.5
Athlone	78.8	82.0	75.0	67.6	57.9	53.2	50.5	45.8	58.9	62.1	71.4	78.7	65.7
Auburn	76.7	77.5	70.5	55.2	47.9	48.1	44.9	39.8	54.5	55.4	63.1	71.3	58.1
Bishop Creek	89.9	88.1	81.1	60.5	48.7	49.5	44.7	41.5	62.5	63.9	72.1	82.6	65.2
Boca	62.7	62.7	54.8	45.0	28.4	34.1	27.4	21.4	34.3	42.9	51.8	56.4	43.3
Bordeau	85.7	86.4	77.1	60.8	48.5	46.5	47.2	46.9	59.0	61.8	72.9	79.2	64.8
Brentwood	82.4	80.9	69.3	62.8	52.6	50.5	49.2	46.7	60.8	64.3	67.8	77.9	63.7
Brighton	81.4	81.4	74.9	65.5	52.6	53.8	50.9	47.6	59.5	62.3	68.8	77.9	64.0
Byron	85.6	82.2	75.8	64.0	52.7	51.2	48.1	46.8	62.5	65.3	74.5	83.7	66.1
Caliente	84.7	85.6	73.4	67.1	53.7	55.0	50.4	47.5	59.0	58.7	68.1	77.6	65.3
Calistoga	73.1	71.6	68.2	58.4	49.5	50.6	47.5	43.3	55.7	59.5	63.8	70.2	59.2
Chico	89.1	85.1	77.9	62.5	52.9	52.6	50.5	45.0	60.0	65.0	72.7	80.6	66.3
Chualar	66.2	66.0	64.7	60.8	56.0	54.0		51.0	60.0	59.6	64.7		60.3
Cisco	62.4	60.5	54.6	40.1	34.7	35.4	29.5	24.4	36.4	38.6	47.9	55.3	43.0
Colfax	72.6	76.1	71.3	54.7	49.5	48.8	45.0	36.8	54.7	54.4	62.3	69.5	58.9
Colton	87.7	86.1	79.1	64.2	59.1	63.0	56.8	51.1	63.4	60.3	68.4	74.8	67.1
Corning	81.4	79.7	73.6	66.0	50.2	51.6	48.7	44.0	55.7	59.8	68.7	78.3	63.1
Davis	80.4	76.2	68.1	60.4	54.2	53.1	50.2	47.6	61.1	62.1	68.7	75.4	63.1
Delano	88.0	87.5	78.3	62.2	48.6	52.0	46.4	48.5	58.4	66.3	74.7	82.7	66.1
Delta	77.3	76.1	72.5	51.8	47.5	45.8	41.2	34.9	50.8	52.6	64.1	70.4	57.6
Dunnigan	84.5	81.2	76.5	64.5	52.3	51.7	51.0	46.1	63.6	64.6	71.7	79.7	65.6
Elmira	84.4	85.4	77.5	65.9	55.9	54.5	53.8	47.5	59.9	63.2	66.6	73.0	65.5
Emigrant Gap	65.3	66.9	64.0	46.2	44.3	44.4	38.6	30.8	43.8	45.9	53.8	61.5	50.5
Eureka							47.0	41.4	49.3	48.5	51.9	52.7	48.7
Farmington	80.4	77.2	72.8	61.8	52.3	50.9	45.9	46.1	61.8	60.5	67.6	74.8	62.5
Fort Bidwell	68.2	69.6	60.2	44.6	33.6	38.4	32.5	24.5	43.6	43.5	53.8	57.7	47.0
Fresno	84.2	85.6	77.4	61.0	57.4	50.9	47.8	49.3	62.7	63.6	72.4	79.6	66.9
Galt	78.0	76.3	70.1	58.6	50.2	49.5	50.5	45.4	60.5	58.6	75.4	81.7	62.1
Gilroy	72.5	71.5	65.3	57.9	51.5	53.2	47.7	46.8	56.5	56.9	62.4	66.6	59.0
Goshen	88.9	88.7	77.5	61.4	48.3	47.4	46.1	47.1	63.7	64.3	73.2	85.6	66.3
Hollister	71.3	73.3	68.3	63.3	53.8	52.1	51.9	49.0	59.8	59.4	65.5	68.0	61.3
Indio	96.5	90.6	83.9	74.4	63.4	62.2	54.1	59.5	76.6	72.8	79.4	90.0	75.3
Ione	77.5	76.0	67.4	54.7	47.1	49.8	44.8	44.9	54.9	57.6	63.7	73.4	59.2
Kings City				62.0	53.8	52.7	49.7	44.6	61.4	58.9	65.6	66.4	57.1
Keeler	79.9	81.5	74.1	58.2	45.1	44.7	43.1	40.0	56.5	57.4	66.7	74.0	60.4
Keene	80.9	80.8	73.7	58.5	52.2	49.1	45.6	41.5	52.0	50.7	60.5	67.1	59.2
Kingsbury	83.6	83.5	73.2	56.4	46.2	45.9	44.3	45.4	59.6	61.1	69.5	77.4	62.4
Knights Landing	81.7	79.9	71.2	60.9	53.8	56.3	54.8	45.8	48.3	53.1	61.3	69.1	61.7
Lathrop	74.6	75.4	68.2	57.3	47.7	48.9	46.4	44.6	56.9	57.9	65.7	72.8	59.8
Lemoore	80.2	82.1	70.5	57.7	45.6	49.8	46.9	49.3	62.9	61.0	69.6	78.1	62.9
Livermore	70.1	72.4	68.5	61.6	53.3	55.2	52.1	45.7	57.3	56.1	60.5	65.9	59.3
Livingston	89.6	91.4	81.9	66.8	63.0	57.4	53.6	52.9	66.1	65.5	73.9	81.2	70.1
Los Angeles	69.7	71.8	65.6	59.3	56.6	55.7	55.4	51.6	59.1	59.1	63.1	66.1	61.7
Mammoth Tank	102.9	102.3	96.7	77.2	62.3	60.8	57.7	58.0	78.4	80.4	91.2	100.2	80.7
Martinez	68.2	68.6	62.6	51.9	49.2	48.7	48.0	44.6	53.6	57.1	60.8	67.5	56.4
Marysville	76.0	76.6	79.0	62.0	61.9	50.8	48.5	42.5	54.9	57.9	71.4	75.6	63.7
Menlo Park	66.5	65.4	61.1	55.5	48.7	50.5	46.4	47.1	55.8	55.4	61.0	66.5	56.0
Merced	81.8	82.0	74.9	61.8	54.2	54.6	49.0	46.8	62.9	62.1	71.7	78.1	65.7
Modesto	86.9	87.3	74.3	61.1	49.8	50.1	46.6	46.1	59.7	63.8	72.5	78.1	64.8
Mojave	84.6	74.6	75.7	59.2	47.1	48.9	45.5	42.3	62.5	67.4	77.9	78.8	63.2
Monterey	60.2	60.3	59.1	54.8	50.8	52.0	49.4	48.3	54.0	53.3	58.4	62.0	55.4
Napa		67.1	58.7	55.1	49.6	50.1	48.8	45.2	53.5	57.9	62.0	72.7	56.6
Newhall	85.7	85.9	70.6	59.4	50.5	53.2	49.0	46.4	56.7	58.6	63.6	71.1	62.2
Niles	71.5	71.4	65.5	56.2	50.2	48.6	46.6	46.8	57.0	56.8	63.4	64.5	58.1
Oakland	62.5	62.1	61.5	56.7	53.6	53.4	51.5	47.7	53.5	56.0	57.5	60.5	56.3
Orland	86.9	85.9	79.3	62.6	54.4	53.5	53.4	45.3	59.4	59.6	69.2	77.8	65.4
Pajaro	63.5	64.2	63.4	57.1	55.5	56.3	51.5	48.4	56.1	54.9	58.2	61.9	57.6
Paso Robles					49.7	49.9	44.3	45.3	54.5	57.9	64.7	70.6	54.6
Petaluma	67.0	68.2	64.9	60.5	54.2	53.8	51.9	49.1	57.5	57.8	65.5	71.7	60.6
Pleasanton	73.7	76.1	70.8	60.5	53.3	53.4	51.6	47.9	57.8	59.5	64.4	69.3	61.2
Red Bluff	82.9	81.5	75.6	60.7	51.3	50.0	48.7	43.4	58.9	60.2	68.8	77.1	63.5

MONTHLY AND ANNUAL MEAN TEMPERATURES—Continued.

PLACE.	1886.						1887.						Mean.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	
Redding	84.6	85.7	79.5	63.7	50.3	48.7	48.6	42.7	59.0	61.6	72.9	76.4	64.5
Rocklin	79.6	76.8	69.7	59.0	51.8	50.5	49.6	47.4	56.3	59.6	66.3	72.1	61.6
Sacramento	72.0	71.6	67.9	57.1	50.4	49.2	48.5	44.7	57.8	58.3	62.9	69.1	59.1
Salinas	62.7	66.1	63.5	56.5	49.2	51.8	47.7	45.2	55.1	54.6	60.5	64.2	56.4
San Ardo .....	.....	.....	70.0	61.6	51.5	50.5	48.0	46.7	56.8	57.7	63.7	67.7	57.4
San Diego	67.1	70.5	66.6	59.7	56.0	56.0	54.2	52.9	57.2	59.0	62.1	64.6	60.5
San Fernando	84.3	83.8	77.6	67.3	64.4	60.2	57.1	54.7	64.9	70.6	74.9	77.1	69.7
San Francisco	59.1	58.5	60.5	57.1	55.1	53.1	51.8	47.0	54.3	54.5	55.8	58.0	55.4
San Geronio	69.1	79.1	71.6	58.9	52.8	50.5	48.8	45.2	58.6	57.5	64.2	72.8	60.8
San José	66.3	66.7	63.7	57.3	52.3	52.4	50.3	48.2	54.8	54.3	58.6	63.9	57.4
San Mateo	68.4	67.5	65.1	59.2	54.0	54.1	50.3	47.0	55.1	57.2	60.6	64.9	58.6
San Miguel .....	.....	.....	.....	56.6	46.8	46.9	48.0	46.3	57.4	56.8	64.5	69.9	54.8
Santa Cruz	66.6	65.0	59.7	50.7	55.7	54.9	52.2	49.3	58.2	57.7	59.7	63.9	58.3
Santa Monica	66.7	69.3	66.5	61.4	58.5	52.4	50.6	48.7	53.2	55.1	62.1	65.1	59.1
Selma	85.9	83.3	75.2	62.6	49.5	47.8	45.2	47.1	60.0	66.3	73.0	79.4	64.6
Soledad	66.7	68.5	67.2	56.5	50.1	51.9	46.4	45.2	57.3	55.7	59.8	66.0	57.6
Soquel	62.6	61.3	61.3	51.2	51.4	59.0	47.7	49.9	58.5	58.2	58.6	58.8	56.5
South Side	76.1	78.6	75.0	58.5	52.2	53.4	48.6	43.2	57.1	55.6	.....	.....	59.8
South Vallejo	72.4	71.7	69.3	61.3	55.6	54.6	53.1	49.4	60.3	62.7	65.3	68.3	62.0
Spadra	70.9	71.9	66.5	53.2	54.8	56.7	54.2	51.6	61.8	59.4	66.9	69.5	61.4
Stockton	74.6	73.1	68.2	59.0	51.0	50.9	46.5	45.9	58.0	59.5	64.0	68.2	60.1
Suisun	72.7	72.4	69.7	61.3	52.5	53.4	51.7	48.5	59.9	61.0	64.7	68.8	61.4
Summit	58.9	59.8	54.7	39.8	31.2	34.9	28.4	22.3	35.0	35.2	43.7	52.4	41.4
Sumner	88.2	83.8	72.8	56.5	46.7	49.5	46.4	50.1	63.1	65.3	75.7	85.2	65.3
Tehama	81.0	80.5	74.1	58.7	50.7	49.1	49.0	44.8	57.7	56.9	63.6	73.4	61.6
Tehachapi	79.9	77.7	66.9	50.7	42.4	44.3	37.4	33.3	49.7	49.9	56.2	63.9	54.4
Templeton .....	.....	.....	.....	.....	44.8	48.0	46.1	47.1	59.1	61.7	67.6	71.2	55.7
Towles	71.7	69.8	67.1	54.1	49.7	51.9	46.5	34.5	52.2	50.6	55.3	62.1	55.5
Tracy	84.1	81.4	73.5	63.8	53.2	52.1	50.9	54.6	62.1	65.0	66.2	75.4	65.2
Traver	81.4	81.5	72.9	56.8	47.8	50.0	46.2	47.0	62.5	64.3	.....	83.0	63.0
Truckee	64.9	61.8	52.3	39.1	32.0	35.9	29.1	24.0	38.2	38.5	50.0	57.5	43.6
Tulare	83.7	87.3	78.1	64.8	49.5	50.7	47.1	48.1	58.8	64.4	69.3	79.1	65.1
Turlock	81.6	82.6	74.1	61.2	55.4	55.4	51.7	52.6	61.7	66.4	73.8	77.5	66.2
Williams	85.8	82.7	75.7	60.6	49.5	52.6	48.6	44.4	59.9	63.9	74.0	78.9	65.2
Willows	82.7	83.1	80.0	64.2	52.9	51.0	50.0	45.7	60.2	64.7	73.1	80.0	65.6
Woodland	80.2	78.6	71.7	55.5	53.3	51.1	49.2	47.6	60.8	62.0	70.0	81.6	63.5

MONTHLY AND ANNUAL MEAN TEMPERATURES

(In degrees Fahrenheit) at Points in California during Year ending June 30, 1888.

Prepared by SERGEANT NELSON GOROM, Observer Signal Corps, San Francisco, California.

PLACE.	1887.						1888.						Mean.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.	
Almaden.....	68.8	67.1	69.5	65.6	56.1	50.7	46.6	54.2	54.5	61.2	62.3	68.6	60.4
Anaheim.....	72.3	71.2	71.7	70.6	61.4	53.8	55.6	58.5	59.5	66.9	67.9	73.5	65.2
Antioch.....	74.8	73.6	73.3	68.4	57.0	49.2	44.6	52.6	54.0	60.0	65.9	67.9	61.8
Aptos.....	61.0	60.1	60.1	59.6	54.5	49.2	46.0	51.9	53.0	58.4	59.7	67.9	56.8
Athlone.....	83.2	79.4	75.3	67.1	54.9	45.5	43.4	52.2	54.8	67.6	71.9	76.4	64.3
Auburn.....	76.0	72.5	71.0	67.1	53.4	44.8	40.4	50.9	51.3	61.4	61.0	66.9	59.7
Beaumont.....	77.9	77.2	74.1	66.2	60.7	47.3	41.5	51.3	48.2	62.0	62.7	69.9	61.6
Bishop Creek.....	87.6	82.0	76.9	64.9	50.0	44.3	33.4	50.9	56.3	69.6	78.1	86.0	65.0
Boca.....	64.9	63.5	55.9	49.6	33.5	22.4	15.8	27.6	33.4	42.5	53.4	58.4	43.4
Borden.....	81.4	79.2	76.5	68.3	55.3	46.6	43.8	51.7	54.7	69.5	70.5	75.4	64.4
Brentwood.....	80.3	79.6	75.9	63.5	52.8	47.2	42.2	51.3	57.8	67.6	75.6	77.8	64.3
Brighton.....	79.9	76.2	76.8	70.4	57.7	49.5	45.4	54.5	55.3	66.9	69.1	74.6	64.7
Byron.....	84.8	78.5	74.5	.....	54.5	48.3	41.8	56.5	59.4	69.2	69.5	78.2	64.8
Caliente.....	86.0	83.1	74.3	68.2	56.6	46.8	47.0	55.4	53.3	67.9	74.1	.....	64.8
Calistoga.....	70.9	65.8	67.4	65.5	51.8	49.4	44.4	53.7	55.1	60.3	58.5	64.8	59.0
Chico.....	88.3	80.1	77.7	70.5	55.2	48.5	42.6	54.9	56.4	70.9	71.6	75.1	66.0
Cisco.....	60.4	57.9	55.8	51.9	41.3	32.1	27.8	33.0	34.8	44.8	48.2	51.1	44.9
Coles.....	.....	.....	.....	.....	.....	.....	40.8	40.6	39.9	51.6	53.0	58.0	47.3
Colfax.....	75.5	71.7	69.0	65.9	53.9	42.4	37.8	47.8	49.0	60.4	61.2	66.4	58.3
Colton.....	78.5	76.9	73.8	65.6	57.0	49.3	47.7	55.6	62.0	65.0	69.0	73.2	64.5
Corning.....	87.3	70.1	75.7	70.1	54.0	48.2	39.9	49.0	50.1	69.5	71.4	72.6	64.0
Davis.....	74.4	74.1	70.6	69.0	55.5	49.0	43.4	50.7	53.1	65.1	66.8	69.9	61.8
Delano.....	91.0	88.2	85.0	72.0	64.9	50.7	44.2	49.0	50.2	66.6	70.9	76.3	67.4
Delta.....	73.9	.....	72.7	61.0	47.7	39.4	33.7	45.8	44.4	62.3	66.4	67.4	55.9
Dunnigan.....	79.3	77.8	73.8	67.9	56.8	48.8	45.0	57.2	61.8	71.5	73.1	79.0	69.0
Dunsmuir.....	.....	.....	.....	.....	.....	.....	.....	.....	43.8	53.9	61.0	52.8	.....
Elmira.....	71.8	71.4	72.8	68.8	55.4	49.8	44.6	54.4	56.6	64.4	65.4	73.1	62.4
Emigrant Gap.....	68.0	66.9	61.9	57.9	47.1	38.4	32.3	40.1	38.7	53.9	53.0	54.7	51.1
Eureka.....	52.5	54.5	53.4	52.3	50.6	47.5	44.6	48.1	47.7	50.9	53.0	58.8	51.2
Farmington.....	77.8	75.4	74.1	69.2	61.3	45.8	44.4	53.1	54.5	66.3	66.5	72.8	63.4
Fort Bidwell.....	67.9	65.7	59.2	51.0	39.6	31.3	21.8	36.6	36.6	51.6	53.8	55.6	47.6
Fresno.....	87.5	82.6	75.2	68.5	56.3	46.3	44.1	53.2	54.1	67.1	68.6	74.0	64.8
Galt.....	79.8	77.9	76.4	63.4	60.8	52.1	46.8	47.5	53.1	68.2	68.7	72.7	64.0
Gilroy.....	65.0	63.7	67.9	64.1	52.7	46.3	44.8	51.1	52.3	62.0	61.8	71.9	58.6
Goshen.....	88.7	85.3	82.4	71.3	57.5	44.4	44.6	54.1	56.9	70.9	74.6	80.7	67.6
Hollister.....	64.9	62.4	65.0	62.1	56.1	52.2	47.6	54.3	54.9	60.9	61.3	67.9	59.1
Hornbrook.....	.....	75.3	68.8	57.3	44.7	35.0	22.0	41.3	47.0	58.5	63.9	69.0	52.7
Indio.....	95.7	94.7	87.9	74.9	62.9	54.1	47.8	60.3	62.3	75.6	74.2	89.7	73.3
Ione.....	76.3	75.6	71.9	61.1	50.6	45.1	42.6	50.6	50.5	61.3	65.4	75.1	60.5
Kings City.....	69.4	64.8	64.8	62.4	54.6	44.4	44.2	48.2	47.1	55.3	63.9	68.7	57.3
Keeler.....	81.1	79.7	72.3	63.4	52.2	42.9	35.3	47.8	50.6	63.4	66.5	73.9	60.8
Keene.....	75.5	64.2	64.7	62.5	55.0	43.4	41.1	47.5	50.5	60.7	63.5	68.3	58.1
Kingsburg.....	84.5	80.7	75.7	64.3	52.3	43.0	41.3	48.5	52.7	70.2	67.9	74.7	63.0
Knights Landing.....	73.7	72.8	67.5	65.7	56.8	46.3	41.3	50.5	51.0	60.3	66.3	67.2	60.0
Lathrop.....	74.9	71.9	70.3	63.2	52.1	46.6	44.9	52.6	53.3	64.3	65.7	72.6	61.0
Lemoore.....	84.0	79.8	73.7	70.9	55.4	45.0	43.8	50.6	53.6	66.8	65.2	74.6	63.7
Livermore.....	66.3	66.4	67.1	66.4	57.3	52.5	46.9	53.7	53.7	59.9	58.8	64.0	59.4
Livingston.....	84.8	79.1	79.1	70.2	60.9	49.6	48.2	56.4	57.8	68.3	70.6	74.9	66.7
Los Angeles.....	69.5	68.5	68.2	68.5	60.0	53.7	50.0	54.4	55.1	61.9	60.8	67.5	61.5
Mammoth Tank.....	100.5	90.4	88.4	80.4	65.8	51.0	49.6	58.4	63.0	82.0	82.6	93.4	75.5
Martinez.....	66.7	61.3	62.9	62.4	54.2	50.3	44.0	53.1	49.7	58.9	58.6	70.7	57.7
Marysville.....	74.1	71.3	69.4	67.1	58.6	53.3	54.5	57.5	63.9	74.4	70.2	78.8	65.8
Menlo Park.....	64.2	63.6	64.6	60.8	53.6	48.3	45.8	52.5	51.4	59.0	60.4	67.0	57.6
Merced.....	82.5	68.5	74.6	72.0	58.8	49.4	47.1	54.6	54.2	65.9	69.3	76.3	64.4
Modesto.....	79.3	78.0	74.2	65.8	53.0	44.9	44.2	50.8	54.4	66.2	66.1	73.4	62.5
Mojave.....	84.9	82.9	77.6	71.5	60.0	50.1	43.7	52.1	53.7	71.0	67.6	73.1	65.7
Montague.....	.....	.....	.....	.....	.....	.....	.....	49.8	49.9	61.9	65.4	65.6	58.5
Monterey.....	61.6	62.1	62.6	61.4	57.5	53.3	49.7	54.8	54.6	57.5	60.0	64.8	54.3
Napa.....	68.1	65.3	64.3	61.6	51.5	48.6	44.6	49.5	51.8	56.4	60.7	69.8	57.7
Newhall.....	75.6	72.2	72.4	65.6	55.8	46.5	45.5	50.9	54.9	65.1	64.0	71.5	61.7
Niles.....	63.2	60.3	63.6	64.6	62.7	.....	.....	50.5	54.8	61.7	63.9	.....	60.6
Oakland.....	58.2	59.0	61.0	61.7	52.9	51.3	47.4	52.6	51.0	57.6	57.0	62.9	56.0
Orland.....	84.9	81.2	77.4	71.9	61.0	50.5	44.5	54.8	53.9	69.0	70.7	75.3	66.3
Pajaro.....	60.2	58.6	61.4	61.6	53.8	51.0	47.1	53.1	52.1	56.0	58.3	63.1	56.4

MONTHLY AND ANNUAL MEAN TEMPERATURES—Continued.

PLACE.	1887.						1888.						Mean.
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.	
Paso Robles.....	72.5	69.0	69.3	61.7	52.4	46.7	41.1	47.8	51.9	62.3	64.0	71.7	59.2
Petaluma.....	66.9	65.1	66.0	66.0	54.7	52.5	44.2	50.8	49.0	57.3	57.8	61.2	57.6
Pleasanton.....	70.4	68.3	68.3	65.1	53.8	51.3	48.1	53.7	54.9	61.8	63.4	69.8	60.7
Red Bluff.....	83.9	81.3	76.4	71.1	55.2	48.2	40.9	53.9	54.5	67.0	68.1	70.7	64.3
Redding.....	79.8	76.8	71.3	70.5	56.0	45.6	39.2	52.4	55.3	69.6	74.2	72.5	63.6
Rocklin.....	76.6	73.0	72.5	67.1	53.4	46.6	42.7	49.8	52.5	59.7	64.0	70.2	52.3
Sacramento.....	70.2	69.1	70.4	66.5	54.7	46.9	42.8	52.6	53.6	62.3	61.8	67.7	59.9
Salinas.....	60.1	59.3	60.3	61.1	51.3	45.8	44.1	49.7	48.6	56.2	58.1	68.4	55.2
San Ardo.....	68.2	68.4	67.4	63.1	52.8	46.4	44.6	50.8	52.0	60.0	62.7	70.1	58.9
San Diego.....	66.4	66.2	65.7	64.5	59.2	54.6	51.6	54.9	55.8	60.8	61.2	65.9	60.6
San Fernando.....	78.9	80.4	.....	70.0	67.1	54.3	44.6	52.4	55.6	69.5	62.1	75.1	64.5
San Francisco.....	55.2	56.3	60.4	62.9	55.2	51.7	46.3	52.8	52.5	56.2	55.4	61.0	55.5
San José.....	64.8	63.3	64.7	62.5	54.6	50.5	46.4	52.6	52.8	58.3	59.8	65.2	58.0
San Mateo.....	63.6	63.6	64.3	64.4	51.2	50.1	46.5	51.2	51.7	58.3	58.2	67.1	57.5
San Miguel.....	73.7	69.9	68.5	67.0	59.3	49.5	43.2	52.5	54.5	61.2	62.2	69.5	60.9
Santa Barbara.....	.....	.....	.....	.....	.....	49.8	48.4	56.1	54.8	62.6	62.8	70.7	57.9
Santa Cruz.....	61.9	62.3	65.1	64.4	55.7	53.0	49.2	53.1	54.8	59.3	59.3	67.5	58.8
Santa Monica.....	66.9	65.8	63.3	67.1	63.9	59.3	56.8	58.0	57.2	65.3	64.0	68.0	63.0
Selma.....	84.9	81.8	75.7	68.6	57.3	45.1	43.6	50.4	51.7	63.1	70.7	77.2	64.2
Sims.....	.....	.....	.....	.....	.....	.....	.....	.....	53.7	66.1	72.4	71.7	66.0
Sisson.....	.....	.....	.....	.....	.....	.....	.....	.....	43.4	60.3	45.4	57.1	51.6
Soledad.....	63.1	61.1	63.3	60.7	50.1	45.4	42.1	50.4	50.5	59.2	57.6	63.6	55.6
Soquel.....	59.1	58.0	56.1	64.6	58.4	52.1	50.3	52.2	53.6	59.6	61.0	68.4	57.8
South Side.....	77.0	75.5	73.9	67.7	59.1	50.7	46.0	52.3	51.5	63.5	61.5	70.0	62.4
South Vallejo.....	67.3	66.5	67.6	65.3	60.3	49.9	44.4	.....	53.4	57.0	57.8	63.7	59.4
Spadra.....	70.7	77.6	68.3	64.2	58.3	50.8	49.1	52.2	51.0	61.8	62.7	70.8	61.5
Stockton.....	70.3	68.4	63.5	63.9	53.4	46.7	44.3	51.1	53.6	62.3	62.0	68.1	59.4
Suisun.....	68.2	69.4	71.6	67.6	56.8	48.3	44.7	51.9	56.9	63.5	61.7	68.3	60.7
Summit.....	59.2	57.4	53.7	49.5	39.7	28.7	22.4	30.9	30.5	40.7	45.9	50.1	42.2
Sumner.....	91.7	85.8	80.8	68.5	57.3	47.6	46.5	54.9	57.7	73.5	75.7	83.2	68.6
Tehama.....	77.9	72.5	75.1	67.5	57.5	46.5	41.1	54.6	54.7	65.9	65.4	68.0	62.3
Tehachapi.....	73.7	71.0	64.4	56.8	46.5	39.0	32.9	41.3	46.2	54.7	61.4	.....	53.4
Templeton.....	73.3	69.7	68.9	65.2	55.1	47.8	46.0	54.0	54.4	61.8	61.2	69.8	60.6
Towles.....	68.1	65.3	64.8	63.3	54.6	46.1	34.5	46.4	49.3	53.9	60.9	55.0	55.2
Tracy.....	81.3	76.3	73.4	67.6	56.8	49.2	47.6	51.4	52.5	65.4	68.3	72.6	63.5
Traver.....	84.6	79.1	74.1	.....	.....	46.5	.....	.....	54.8	65.2	76.4	83.0	70.5
Tropico.....	.....	.....	.....	.....	.....	47.3	48.3	52.7	55.7	64.3	65.7	71.8	58.0
Truckee.....	62.9	60.0	52.1	46.4	37.8	25.1	20.2	29.6	33.6	46.5	51.6	56.0	43.5
Tulare.....	84.8	80.8	78.6	71.6	58.1	43.3	44.0	51.5	57.0	73.0	75.0	80.5	66.5
Turlock.....	80.0	73.5	74.4	69.2	55.8	48.1	45.7	53.2	55.9	64.6	67.0	74.1	63.5
Williams.....	83.1	81.2	75.4	72.7	59.4	51.8	46.1	53.4	52.6	64.1	68.9	79.0	65.6
Willows.....	86.3	87.0	78.4	71.7	56.0	46.3	40.3	51.1	51.6	64.1	67.2	70.9	64.2
Woodland.....	82.8	78.6	77.1	78.1	68.1	51.9	43.2	46.1	48.1	51.7	62.5	67.3	63.0

SEASONAL RAINFALL

Prepared in the Office of the Officer in Charge of the Pacific Coast Division Signal Ser-

STATIONS.	July, 1886	Aug., 1886	Sept., 1886	Oct., 1886	Nov., 1886	Dec., 1886	Jan., 1887	Feb., 1887	March, 1887
Almaden, Santa Clara Co.	—	—	—	—	0.80	—	1.52	8.68	0.92
Anaheim, Los Angeles Co. ....	.00	T.	.00	.00	0.33	T.	0.43	5.71	.00
Aptos, Santa Cruz Co. ....	.00	.00	.00	0.70	0.84	1.53	0.95	8.82	0.76
Auburn, Placer Co. ....	.00	.00	.00	0.89	1.26	4.88	2.04	12.38	1.50
Athlone, Merced Co. ....	.00	.00	.00	0.32	0.92	0.69	0.38	3.52	0.23
Antioch, Contra Costa Co. ....	.00	.00	.00	0.40	T.	1.02	0.38	3.87	0.49
Battle Mountain, Lander Co., Nev.	0.38	.00	0.18	1.20	1.50	0.44	0.73	1.15	0.30
Benson, Cochise Co., A. T.	1.44	2.68	0.17	0.25	.00	0.19	.00	0.34	.00
Beowawe, Eureka Co., Nev.	0.25	.00	.00	1.20	0.80	0.68	0.20	1.20	.00
Bishop, Inyo Co. ....	.00	.00	.00	.00	.00	0.20	0.65	1.58	.00
Blue Creek, Box Elder Co., Utah.	0.88	0.55	0.91	0.85	1.05	0.28	0.75	0.78	0.30
Boca, Nevada Co.	—	.00	0.10	0.70	0.70	0.70	2.40	12.70	.00
Borden, Fresno Co. ....	.00	.00	.00	0.38	0.65	0.57	0.25	2.24	0.30
Brentwood, Contra Costa Co. ....	.00	.00	.00	0.15	0.24	0.87	0.38	5.05	0.61
Browns, Humboldt Co., Nev. ....	.00	.00	.00	0.62	0.10	0.47	T.	1.29	0.25
Brighton, Sacramento Co. ....	.00	.00	.00	0.85	0.12	1.47	0.80	4.87	1.08
Byron, Contra Costa Co. ....	.00	.00	.00	0.89	.00	0.95	0.48	4.43	0.19
Caliente, Kern Co.	T.	.00	.00	T.	1.45	1.33	0.38	2.79	0.07
Calistoga, Napa Co. ....	.00	.00	.00	1.25	.00	3.95	2.22	11.18	1.58
Carlin, Elko Co., Nev.	0.08	.00	.00	0.24	0.85	0.85	0.61	2.00	0.14
Casa Grande, Pinal Co., A. T.	0.33	1.40	.00	.00	0.35	.00	.00	0.40	.00
Cisco, Placer Co. ....	.00	.00	.00	1.45	1.00	6.10	4.90	22.85	0.80
Chico, Butte Co. ....	.00	.00	.00	0.97	0.15	2.78	0.68	6.53	1.38
Colfax, Placer Co. ....	.00	.00	.00	1.96	0.46	6.12	2.99	9.24	1.31
Corinne, Box Elder Co., Utah	0.65	0.15	1.75	1.50	1.40	0.25	0.88	1.35	0.70
Corning, Tehama Co. ....	.00	.00	.00	0.30	.00	2.01	0.45	6.81	1.46
Chualar, Monterey Co. ....	.00	.00	.00	0.15	0.70	0.40	—	2.50	0.60
Colton, San Bernardino Co. ....	.00	.00	.00	.00	0.80	.00	0.21	3.64	.00
Davisville, Yolo Co. ....	.00	.00	.00	0.48	.00	1.81	0.99	6.14	0.78
Delta, Shasta Co. ....	.00	.00	T.	1.30	0.30	8.81	3.84	10.27	3.37
Delano, Kern Co. ....	.00	.00	.00	T.	0.69	0.34	0.20	2.63	.00
Deming, Grant Co., N. M.	1.13	4.19	4.36	0.50	.00	.00	.00	0.20	.00
Dunnigan, Yolo Co. ....	.00	.00	.00	0.51	T.	1.91	0.97	6.93	1.13
Elko, Elko Co., Nev. ....	.00	.00	.00	0.20	0.60	—	0.02	1.60	.00
Elmira, Solano Co. ....	.00	.00	.00	0.28	.00	2.74	1.01	7.10	0.55
Emigrant Gap, Placer Co. ....	.00	.00	.00	2.96	0.40	8.00	4.12	18.80	2.03
Farmington, San Joaquin Co. ....	.00	.00	.00	0.27	0.89	1.37	0.36	3.37	0.29
Fresno, Fresno Co. ....	.00	.00	.00	0.47	0.70	0.34	0.31	2.80	0.09
Galt, Sacramento Co. ....	.00	.00	.00	0.92	0.85	1.76	0.61	5.35	1.11
Gilroy, Santa Clara Co. ....	.00	.00	.00	0.78	0.33	1.09	0.90	5.14	0.82
Golconda, Humboldt Co.	0.42	.00	.00	0.91	0.21	0.25	0.08	1.15	T.
Goshen, Tulare Co. ....	.00	.00	.00	0.10	0.55	0.69	0.35	2.26	0.56
Halleck, Elko Co., Nev. ....	.00	.00	.00	1.19	0.80	0.20	0.30	1.85	.00
Hawthorn, Esmeralda Co., Nev.	T.	.00	.00	.00	.00	—	T.	1.85	.00
Hollister, San Benito Co. ....	.00	.00	.00	0.38	0.42	0.54	0.57	3.63	0.55
Hot Springs, Churchill Co., Nev. ....	.00	.00	.00	0.46	0.50	T.	0.12	1.80	.00
Humboldt, Humboldt Co., Nev.	T.	.00	.00	0.10	0.60	0.24	.00	1.25	.00
Indio, San Diego Co. ....	.00	.00	.00	.00	0.12	.00	.00	0.98	.00
Ione, Amador Co. ....	.00	.00	.00	1.20	0.70	0.64	0.83	7.26	1.55
Keeler, Inyo Co.	0.14	0.08	.00	0.01	0.08	.00	T.	0.75	.00
Keene, Kern Co.	T.	0.02	.00	T.	1.95	1.10	0.51	3.20	0.92
Kelton, Box Elder Co., Utah	1.22	0.44	0.35	0.58	1.25	0.32	0.04	0.48	0.03
Kingsburg, Fresno Co. ....	.00	.00	.00	0.20	0.58	0.43	0.36	2.48	0.13
Kings City, Monterey Co.	—	—	—	0.14	0.36	0.03	0.38	5.08	0.18
Knights Landing, Yolo Co. ....	.00	.00	.00	0.23	.00	1.60	1.00	6.60	0.75
Lathrop, San Joaquin Co. ....	.00	.00	.00	0.21	0.83	0.40	0.21	2.84	0.14
Lemoore, Fresno Co.	T.	.00	.00	0.25	0.30	0.15	0.23	2.19	0.10
Livermore, Alameda Co.	0.40	.00	.00	0.30	0.70	0.81	0.90	6.23	0.23
Livingston, Merced Co. ....	.00	.00	.00	0.16	0.53	0.46	0.37	2.41	0.43
Lordsburg, Grant Co., N. M.	1.54	1.65	1.17	0.17	0.20	.00	.00	0.12	.00
Mammoth Tank, San Diego Co. ....	.00	0.01	.00	0.01	.00	0.24	.00	1.38	.00
Maricopa, Pinal Co., A. T. ....	.00	0.75	.00	1.00	.00	.00	.00	0.57	.00
Martinez, Contra Costa Co.	0.07	.00	.00	0.35	0.58	1.29	0.94	7.46	0.56
Marysville, Yuba Co. ....	.00	.00	.00	0.63	T.	2.20	0.73	6.09	1.02

"T"—Trace of precipitation. Too small to be measured.

FOR 1886, 1887, 1888.

vice, U. S. A., by FRANCIS CHREIGHTON, Observer Signal Corps, San Francisco, California.

April, 1887	May, 1887	June, 1887	July, 1887	Aug., 1887	Sept., 1887	Oct., 1887	Nov., 1887	Dec., 1887	Jan., 1888	Feb., 1888	March, 1888	April, 1888	May, 1888	June, 1888
1.60	2.21	.00	.00	.00	0.20	0.05	0.78	4.44	4.51	1.24	4.73	0.32	0.64	0.16
1.61	1.61	.00	.00	.00	T.	0.75	0.92	2.16	6.29	0.92	5.32	T.	.00	.00
1.62	1.62	.00	.00	.00	0.47	0.05	1.11	3.72	5.85	1.59	3.25	0.50	0.79	0.25
1.80	1.80	.00	.00	T.	1.09	.00	1.22	7.90	7.07	1.40	1.70	0.98	0.40	1.55
1.82	1.82	0.23	.00	.00	0.58	.00	0.23	1.11	2.29	.00	2.05	0.30	0.60	.00
1.85	1.85	.00	.00	0.41	.00	.00	0.29	2.30	2.84	1.24	5.90	.00	0.50	.00
1.86	1.86	0.50	0.12	0.18	—	.00	0.10	1.50	3.12	0.30	0.25	0.35	1.50	0.51
1.87	1.87	.00	1.49	2.39	2.92	0.45	0.37	0.15	0.04	.00	0.30	.00	0.37	.00
1.88	1.88	.00	.00	.00	.00	.00	0.50	0.20	1.10	0.10	.00	0.15	0.35	0.59
1.89	1.89	0.35	.00	.00	0.15	0.15	0.05	1.10	1.37	0.47	0.92	0.05	.00	0.35
1.90	1.90	0.10	0.10	.00	0.40	.00	0.30	0.70	2.10	0.15	0.55	0.45	0.10	0.05
1.91	1.91	—	—	T.	—	.00	0.30	—	3.75	1.10	2.40	0.40	0.51	0.10
1.92	1.92	.00	.00	.00	0.46	0.05	0.28	0.78	0.93	0.17	1.98	0.11	0.47	.00
1.93	1.93	.00	.00	.00	0.50	.00	0.40	2.62	4.24	0.40	2.28	0.02	0.59	.00
1.94	1.94	0.20	.00	0.15	0.25	.00	.00	—	0.40	0.35	.00	0.20	0.38	0.08
1.95	1.95	.00	.00	.00	.00	.00	0.57	2.70	4.67	0.62	2.86	0.30	0.59	.00
1.96	1.96	.00	.00	.00	.00	T.	0.42	2.90	2.67	1.25	1.77	.00	0.75	.00
1.97	1.97	.00	.00	.00	.00	0.63	0.05	1.43	—	1.14	1.50	.00	0.81	.00
1.98	1.98	.00	.00	.00	0.18	.00	1.50	4.82	7.87	2.87	5.64	0.28	0.20	1.16
1.99	1.99	0.13	0.35	0.01	0.10	.00	0.20	0.70	2.20	0.20	.00	0.50	1.00	0.25
2.00	2.00	0.40	1.07	0.97	1.99	0.96	1.28	0.15	0.61	.00	0.45	.00	.00	.00
2.01	2.01	.00	T.	.00	0.15	.00	1.60	8.80	9.75	2.72	6.10	0.20	1.50	1.90
2.02	2.02	0.96	.00	.00	.00	.00	1.05	2.53	4.95	1.15	1.94	0.15	.00	1.20
2.03	2.03	.00	.00	.00	0.68	0.84	1.61	6.00	13.28	2.18	2.80	0.95	0.17	2.60
2.04	2.04	0.30	0.35	0.25	0.15	.00	0.18	1.10	2.70	0.75	1.35	1.10	0.30	0.40
2.05	2.05	0.18	.00	.00	.00	.00	1.37	3.70	3.64	2.09	3.20	0.19	0.40	0.79
2.06	2.06	—	—	—	—	.00	—	—	—	—	—	—	—	—
2.07	2.07	.00	.00	.00	.00	.00	0.80	—	—	—	3.68	0.43	.00	.00
2.08	2.08	.00	.00	.00	0.05	.00	0.50	2.52	4.14	1.10	2.80	0.30	0.50	.00
2.09	2.09	0.82	.00	.00	.00	.00	0.75	2.23	10.45	4.67	1.70	.00	2.45	3.30
2.10	2.10	.00	.00	.00	.00	.00	0.03	0.60	2.21	.00	0.94	.00	0.15	.00
2.11	2.11	.00	2.02	3.46	3.39	2.13	0.31	0.05	0.28	—	0.24	0.50	0.70	0.50
2.12	2.12	.00	.00	.00	.00	.00	0.83	3.30	4.18	1.03	3.39	.00	1.62	.00
2.13	2.13	0.23	0.40	0.10	0.15	.00	0.20	0.98	1.08	0.20	0.64	0.80	1.21	.00
2.14	2.14	.00	.00	.00	.00	.00	0.76	3.41	4.81	1.49	3.92	T.	0.45	0.19
2.15	2.15	1.14	.00	0.13	0.05	3.00	1.50	7.70	17.05	3.92	5.42	3.30	2.33	3.04
2.16	2.16	T.	.00	.00	0.39	T.	0.20	2.32	3.82	0.15	3.52	0.07	0.92	.00
2.17	2.17	0.02	.00	.00	0.52	0.29	0.27	0.67	1.84	0.10	1.99	0.15	0.48	.00
2.18	2.18	.00	.00	.00	0.15	.00	0.38	3.27	3.97	0.46	3.14	0.40	0.39	.00
2.19	2.19	.00	.00	.00	0.43	.00	1.15	4.32	5.35	0.77	3.92	0.40	0.44	.00
2.20	2.20	0.85	.00	.00	.00	.00	0.10	0.30	0.70	—	.00	0.95	1.25	0.45
2.21	2.21	.00	.00	.00	0.50	0.17	0.12	1.18	2.11	0.19	1.33	0.12	0.29	.00
2.22	2.22	.00	0.25	0.10	0.40	.00	0.60	0.90	0.85	0.25	0.10	0.88	0.67	0.70
2.23	2.23	1.13	0.25	.00	0.30	.00	0.10	0.42	2.38	0.26	0.30	—	1.20	.00
2.24	2.24	0.02	.00	.00	0.43	.00	0.60	1.54	3.61	0.97	2.75	0.40	0.80	0.02
2.25	2.25	0.12	T.	.00	.00	.00	.00	0.15	0.60	0.20	0.05	0.05	0.21	.00
2.26	2.26	1.30	.00	0.20	.00	.00	.00	0.50	0.60	—	T.	0.25	0.20	.00
2.27	2.27	.00	.00	T.	0.05	0.15	.00	.00	0.75	.00	.00	.00	.00	.00
2.28	2.28	0.30	.00	.00	0.67	.00	0.25	3.17	4.60	0.58	1.16	0.70	0.22	.00
2.29	2.29	1.44	.00	.00	1.05	0.84	0.01	—	0.70	1.21	0.30	0.12	0.30	0.20
2.30	2.30	1.18	T.	0.52	0.12	1.32	0.50	1.72	1.30	1.70	2.69	0.78	2.03	.00
2.31	2.31	2.73	.00	.00	0.10	.00	0.40	0.60	1.50	0.35	0.70	0.30	0.20	1.13
2.32	2.32	1.57	0.42	.00	0.53	.00	0.15	1.16	2.29	0.29	1.64	.00	0.21	.00
2.33	2.33	2.10	.00	.00	0.06	0.05	0.31	1.99	2.85	0.70	2.76	0.10	0.01	.00
2.34	2.34	0.58	.00	.00	.00	.00	0.57	3.26	4.18	0.91	2.51	0.07	0.43	0.34
2.35	2.35	2.30	.00	.00	.00	.00	0.30	2.27	2.46	0.41	1.09	0.49	.00	.00
2.36	2.36	1.25	.00	.00	.00	.00	0.33	0.90	1.89	.00	1.28	.00	0.88	.00
2.37	2.37	2.07	1.03	.00	0.80	.00	0.61	3.51	5.20	0.94	2.54	0.60	0.66	0.30
2.38	2.38	1.60	.00	.00	0.17	.00	0.11	1.81	2.79	0.29	2.07	0.26	0.22	.00
2.39	2.39	1.46	.00	.00	1.31	.00	0.32	0.70	0.44	0.10	0.88	.00	.00	0.28
2.40	2.40	.00	0.19	.00	0.33	0.03	0.20	0.05	0.05	0.07	0.05	0.03	0.01	.00
2.41	2.41	0.13	.00	.00	—	0.28	1.13	.00	.00	0.12	0.48	.00	.00	.00
2.42	2.42	0.05	0.25	.00	0.33	.00	0.30	0.95	4.24	1.65	3.54	.00	0.10	0.15
2.43	2.43	1.94	.00	.00	.00	.00	1.07	3.70	4.58	—	2.55	.00	0.41	0.32

SEASONAL RAIN

STATIONS.	July, 1886.	Aug., 1886	Sept., 1886	Oct., 1886	Nov., 1886	Dec., 1886	Jan., 1887	Feb., 1887	March, 1887
Menlo Park, San Mateo Co.	0.24	.00	.00	0.86	0.40	1.26	0.72	4.92	0.46
Merced, Merced Co. ....	.00	.00	.00	0.47	0.25	0.58	0.13	2.83	0.20
Modesto, Stanislaus Co. ....	.00	.00	.00	0.25	1.01	0.65	0.09	2.16	0.34
Mojave, Kern Co.	T.	.00	.00	T.	0.76	0.08	T.	4.09	.00
Monterey, Monterey Co. ....	.00	.00	.00	0.70	0.78	0.80	0.35	4.92	0.60
Napa, Napa Co. ....	.00	.00	.00	1.16	0.11	2.58	1.87	10.68	0.67
Newhall, Los Angeles Co. ....	.00	.00	.00	.00	0.87	0.21	.00	12.38	6.15
Niles, Alameda Co. ....	.00	.00	.00	0.57	1.27	1.15	1.20	9.44	0.83
Arcata, Humboldt Co. ....	.00	.00	.00	3.19	1.77	9.03	9.43	8.73	2.65
Carson City, Ormsby Co., Nev.	1.25	.00	0.30	0.21	0.44	0.72	1.01	3.27	0.23
Crescent City, Del Norte Co.	1.02	0.04	0.12	5.12	1.26	19.28	17.94	9.41	7.24
Berkeley, Alameda Co. ....	.00	.00	.00	.00	.00	3.93	1.06	8.44	0.98
Denverton, Solano Co. ....	.00	T.	.00	1.27	0.27	1.51	0.83	5.64	0.81
Downey, Los Angeles Co. ....	.00	0.38	.00	.00	0.72	0.08	0.02	5.64	0.04
Evergreen .....	.00	.00	.00	.00	.00	0.96	0.79	6.13	0.75
Elsinore, San Diego Co. ....	.00	.00	.00	.00	.00	0.09	0.16	7.01	0.06
Folsom, Sacramento Co. ....	.00	.00	.00	1.34	0.55	3.35	1.27	9.21	1.30
Fouts Springs, Colusa Co. ....	.00	.00	.00	0.70	0.20	2.83	2.00	7.88	2.12
Fort Jones, Siskiyou Co.	2.13	0.85	.00	1.86	0.80	6.62	5.28	4.96	1.07
Grass Valley, Nevada Co. ....	.00	.00	.00	.00	.00	1.96	.00	16.53	1.69
Jolon, Monterey Co. ....	.00	.00	.00	0.35	0.48	0.61	0.57	8.52	0.38
La Grange, Stanislaus Co. ....	.00	.00	.00	0.22	1.20	0.75	0.51	5.11	0.04
Los Banos, Merced Co. ....	.00	.00	.00	0.42	0.18	0.21	0.06	1.50	0.44
Lugonia, San Bernardino Co. ....	.00	.00	.00	0.07	1.13	0.07	0.09	5.05	0.19
Nordhoff, Ventura Co. ....	.00	.00	.00	0.36	1.10	0.76	0.22	16.81	0.44
Poway, San Diego Co.	T.	0.02	.00	0.10	1.50	0.20	0.09	4.87	0.34
Sonoma, Sonoma Co.	T.	.00	T.	0.95	0.27	2.36	1.94	11.77	0.91
Santa Clara, Santa Clara Co. ....	.00	.00	0.01	0.06	7.58	.00	.00	6.94	0.70
Shingle Springs, El Dorado Co. ....	.00	.00	.00	1.66	0.93	3.50	1.67	12.21	1.45
Upper Mattole, Humboldt Co. ....	.00	.00	.00	.00	.00	17.88	1.61	11.91	3.34
Vichy Springs, Mendocino Co. ....	.00	.00	.00	.00	.00	.00	2.17	7.59	1.60
Vacaville, Solano Co. ....	.00	.00	.00	.00	.00	2.39	1.61	8.44	1.17
Wheatland, Yuba Co. ....	.00	.00	.00	.00	.00	1.83	0.94	5.37	1.33
Santa Maria, Santa Barbara Co. ....	.00	.00	.00	0.06	0.59	0.72	0.50	5.95	0.25
Point Conception .....	.00	9.17	.00	0.04	0.48	.00	0.20	4.92	.00
Año Nuevo Island .....	.00	.00	.00	1.45	0.75	1.95	1.36	6.16	0.36
Pigeon Point .....	.00	.00	.00	1.65	0.35	0.72	0.87	5.86	0.18
Point Mentora	0.09	.00	.00	1.80	0.46	2.26	1.96	8.14	0.78
Farallone Islands .....	.00	.00	0.50	1.15	0.55	1.40	0.80	7.52	0.45
Point Benito .....	.00	.00	.00	1.56	0.70	2.53	1.56	10.41	1.22
Yerba Buena Island .....	.00	.00	0.02	1.35	0.48	1.82	0.81	6.89	0.50
East Brother Island .....	.00	.00	.00	0.36	0.08	1.07	0.17	3.01	0.16
Point Reyes	0.13	.00	.00	0.55	1.45	1.76	0.35	3.90	0.53
Point Arena .....	.00	.00	.00	1.07	0.55	4.68	3.07	5.04	1.69
Crescent City .....	.00	.00	.00	4.09	.00	12.60	12.90	7.68	4.63
Humboldt	0.02	.00	.00	2.23	0.85	8.19	7.32	7.11	2.32
Orland, Colusa Co. ....	.00	.00	.00	0.50	T.	1.77	0.33	3.74	1.63
Ogden, Weber Co., Utah .....	.00	0.42	1.23	1.97	1.72	0.59	1.80	2.28	0.49
Oakland, Alameda Co.	0.08	.00	.00	1.60	0.25	2.96	1.31	8.01	0.65
Otego, Elko Co., Nevada .....	.00	0.36	0.17	1.66	0.45	0.51	1.07	1.70	0.35
Pajaro, Monterey Co. ....	.00	.00	.00	0.85	0.60	1.24	1.57	5.95	0.61
Palisade, Eureka Co., Nevada .....	.00	.00	0.10	0.40	1.25	0.37	0.45	2.12	.00
Pantano, Pima Co., Arizona	1.00	2.54	2.24	0.46	0.50	.00	.00	1.15	.00
Paso Robles, San Luis Obispo Co. ....	.00	.00	.00	.00	0.37	0.69	0.51	6.14	0.34
Petaluma, Sonoma Co. ....	.00	.00	0.02	0.69	0.57	1.21	1.25	10.43	0.79
Pleasanton, Alameda Co. ....	.00	.00	.00	0.39	0.73	0.87	0.79	5.93	0.68
Redding, Shasta Co. ....	.00	.00	.00	0.98	0.13	5.34	2.50	8.35	1.20
Red Bluff, Tehama Co. ....	.00	.00	.00	1.92	0.47	4.06	0.62	5.10	1.30
Reno, Washoe Co., Nevada	0.15	.00	.00	0.02	0.35	0.30	0.60	2.90	.00
Rocklin, Placer Co. ....	.00	.00	.00	1.04	0.97	2.43	0.75	6.77	1.80
Salinas, Monterey Co. ....	.00	.00	.00	0.59	0.80	0.85	0.78	4.62	0.63
San Ardo, Monterey Co. ....	.00	.00	.00	.00	0.35	0.17	0.58	5.58	0.17
Santa Cruz, Santa Cruz Co. ....	.00	.00	.00	0.79	1.10	2.20	1.01	9.62	0.53
San Fernando, Los Angeles Co.	0.19	T.	.00	0.78	0.87	0.24	0.21	8.54	0.27
San Geronimo, S. Buenav'tura Co. ....	.00	.00	.00	.00	0.58	0.08	0.06	5.07	0.08
San José, Santa Clara Co.	0.03	.00	.00	0.49	0.73	0.71	0.68	6.81	0.63

"T"—Trace of precipitation. Too small to be measured.

FALL—Continued.

June, 1888	May, 1888	April, 1888	March, 1888	Feb., 1888	Jan., 1888	Dec., 1887	Nov., 1887	Oct., 1887	Sept., 1887	Aug., 1887	July, 1887	June, 1887	May, 1887	April, 1887
0.09	0.37	0.02	2.31	1.36	3.17	2.16	0.85	1.00	0.22	1.00	1.00	1.00	0.01	1.18
0.10	0.65	0.28	1.68	0.15	2.67	1.00	0.10	0.00	0.45	1.00	1.00	1.00	1.00	1.74
0.10	0.69	0.25	1.36	0.53	1.72	1.76	0.10	0.00	0.05	1.00	1.00	1.00	1.00	1.22
1.00	1.00	1.00	1.75	1.50	2.62	1.00	0.95	0.50	1.00	1.00	1.00	1.00	1.00	0.14
1.00	0.81	0.23	3.29	1.09	3.95	1.81	1.35	1.00	0.25	1.00	1.00	1.00	1.00	1.16
1.00	0.88	0.65	4.18	—	4.87	1.35	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.27
1.00	0.04	0.29	4.21	1.17	6.74	4.26	1.46	0.65	0.02	1.00	1.00	1.00	1.00	1.96
1.00	0.60	0.23	2.83	—	—	0.93	0.00	0.00	0.54	1.00	1.00	1.00	1.00	1.27
1.00	1.00	1.00	2.77	2.57	11.36	7.47	3.40	0.44	0.46	1.00	1.00	1.00	1.00	6.49
0.08	1.05	0.18	0.54	0.22	1.51	2.08	0.04	0.04	0.11	1.00	0.23	0.46	0.46	0.65
1.04	1.04	—	5.86	3.52	22.40	16.66	5.79	1.08	0.08	1.00	1.00	1.20	1.20	5.65
0.50	0.42	0.42	4.50	1.92	5.84	2.95	0.76	1.00	0.39	1.00	1.00	0.04	0.04	2.53
1.00	0.43	0.04	3.18	1.56	3.57	3.06	0.54	1.00	0.19	1.00	1.00	1.00	1.00	2.17
1.00	0.02	0.11	6.32	0.22	5.33	2.46	0.45	0.41	0.28	1.00	1.00	1.00	1.00	2.31
0.24	0.81	0.08	3.32	1.44	2.61	2.47	0.83	1.00	0.32	1.00	1.00	1.00	1.00	0.08
1.00	0.09	0.08	5.87	0.30	6.09	4.04	1.72	0.32	0.16	1.00	1.00	1.00	1.00	1.54
0.27	0.35	0.12	3.08	0.84	5.83	4.82	0.59	1.00	0.38	1.00	1.00	1.00	1.00	2.48
0.65	0.35	1.00	5.00	0.70	10.83	7.85	0.12	1.00	1.00	1.00	1.00	1.00	1.00	4.36
4.21	1.80	0.08	2.43	1.77	6.18	3.88	1.75	0.09	0.35	1.00	0.17	0.36	0.36	2.63
2.26	0.78	0.58	5.22	2.46	12.44	6.65	1.38	1.00	0.26	1.00	1.00	0.52	0.52	6.54
0.01	0.37	1.00	4.81	0.16	5.64	4.42	0.94	0.21	0.21	1.00	1.00	1.00	1.00	1.11
1.00	0.52	0.02	2.63	0.06	2.84	2.15	0.20	1.00	0.37	1.00	1.00	1.00	1.00	2.82
1.00	0.19	1.00	1.33	0.06	1.83	0.74	0.05	1.00	1.00	1.00	1.00	1.00	1.00	0.43
1.00	0.38	1.00	3.25	2.00	4.80	3.19	4.00	0.70	1.00	1.00	1.00	1.00	1.00	2.38
0.26	0.54	0.54	5.49	1.28	7.46	5.29	1.63	0.89	0.11	1.00	1.00	1.00	1.00	1.88
0.51	0.10	0.10	4.85	0.89	4.01	2.70	2.04	1.00	0.62	1.00	1.00	1.00	1.00	2.01
0.73	1.42	0.19	4.55	0.70	5.78	4.97	2.08	1.00	0.25	1.00	1.00	1.00	1.00	1.00
0.18	1.28	0.12	3.10	1.68	3.08	2.45	0.69	1.00	0.41	1.00	1.00	1.00	1.00	1.22
0.31	0.18	0.43	4.22	1.08	8.22	6.18	1.08	1.00	0.49	1.00	1.00	1.00	1.00	6.24
1.00	0.48	1.51	8.69	4.13	41.63	11.24	6.44	0.18	0.09	1.00	1.00	1.00	1.00	9.80
1.29	0.21	0.06	4.45	2.01	9.55	4.40	1.40	1.00	0.33	1.00	1.00	1.00	1.00	1.00
0.19	0.52	0.13	4.23	9.55	6.93	4.32	1.06	1.00	0.26	1.00	1.00	1.00	1.00	2.81
0.35	0.38	0.16	2.42	1.06	4.13	2.01	0.50	1.00	0.06	1.00	1.00	1.00	1.00	2.15
1.00	0.14	0.12	1.90	0.43	4.62	2.69	1.09	1.00	0.30	1.00	1.00	1.00	1.00	1.07
1.00	0.08	1.00	3.65	0.60	6.49	3.03	1.88	1.00	1.00	1.00	1.00	1.00	1.00	0.55
0.30	0.98	0.08	4.72	0.84	7.22	5.40	1.73	1.00	0.25	1.00	1.00	1.00	1.00	1.57
0.28	1.52	1.00	3.80	1.04	5.49	1.91	1.34	1.00	0.05	1.00	1.00	1.00	1.00	1.58
0.53	0.43	0.01	4.59	1.56	5.63	2.79	1.45	1.00	0.21	1.00	1.00	1.00	1.00	1.54
0.16	0.05	1.00	2.59	0.53	3.20	2.52	0.60	1.00	0.90	1.00	1.00	1.00	1.00	1.55
0.45	0.63	0.28	3.85	1.46	6.96	3.12	1.11	1.00	0.40	1.00	1.00	1.00	1.00	2.06
0.05	0.41	1.00	2.92	5.10	2.23	0.60	0.60	1.00	0.22	1.00	1.00	1.00	1.00	1.60
0.08	0.05	1.00	0.87	2.15	0.94	0.10	0.10	1.00	0.28	1.00	1.00	1.00	1.00	0.32
2.70	0.75	0.25	2.95	1.29	11.41	3.68	2.31	1.00	0.07	1.00	1.00	1.00	1.00	3.20
6.49	0.65	0.13	4.55	3.25	22.46	12.60	4.22	0.97	0.43	1.00	1.00	1.00	1.00	6.69
4.22	0.85	0.65	3.79	1.30	12.39	5.20	2.63	0.39	0.30	1.00	0.04	2.09	2.31	5.44
0.53	0.24	0.57	2.73	1.56	4.11	2.64	1.14	1.00	0.00	1.00	1.00	1.00	1.00	2.06
1.07	0.28	0.21	1.20	1.06	2.60	0.80	1.00	1.15	0.55	1.00	0.43	0.25	0.08	1.88
0.24	0.25	1.00	4.63	1.38	6.17	3.52	0.81	1.00	0.25	1.00	1.00	1.00	1.00	2.42
1.00	1.00	1.00	—	1.00	—	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.37
0.58	0.47	0.47	4.27	0.91	4.59	3.44	0.87	1.00	0.58	1.00	1.00	1.00	1.00	2.03
0.62	0.32	0.19	0.15	0.15	0.85	0.10	0.10	1.00	0.50	1.00	1.00	1.00	1.00	1.00
1.00	0.25	0.02	1.42	1.00	1.00	1.19	0.50	0.38	1.38	1.00	1.86	0.31	0.10	1.00
1.00	0.28	0.20	4.50	0.30	5.60	2.61	0.60	0.21	0.00	1.00	1.00	1.00	1.00	1.10
0.30	1.00	0.36	4.85	3.10	3.72	3.30	1.79	1.00	0.68	1.00	1.00	1.00	1.00	1.46
0.27	0.50	0.50	2.25	2.00	3.23	2.63	0.55	1.00	0.29	1.00	1.00	1.00	1.00	1.52
3.52	0.73	0.00	2.79	2.70	9.35	4.10	1.60	1.00	0.15	1.00	1.00	1.00	1.00	3.65
2.67	0.30	0.48	3.21	2.15	4.47	2.82	1.52	1.00	1.00	1.00	1.00	1.00	1.00	1.87
1.00	0.38	1.00	0.80	1.00	1.35	1.60	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.18
1.00	0.53	1.00	2.05	0.76	4.39	3.38	1.05	1.00	0.05	1.00	1.00	1.00	1.00	3.53
1.00	0.39	0.38	2.86	0.82	3.74	2.40	0.94	1.00	0.68	1.00	1.00	1.00	1.00	1.39
1.00	0.27	0.11	2.91	0.28	3.44	2.07	0.32	0.37	0.14	1.00	1.00	1.00	1.00	0.76
0.09	1.08	0.57	4.61	1.93	8.00	4.58	1.21	0.42	0.42	1.00	1.00	1.00	1.00	1.90
1.00	1.00	0.44	3.40	1.00	1.41	0.90	0.22	0.00	0.00	1.00	1.00	1.00	1.00	2.52
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.94
0.22	0.60	0.31	3.00	1.09	3.06	2.53	0.70	0.03	0.61	1.00	1.00	1.00	1.00	1.28

SEASONAL RAIN

STATIONS.	July, 1886	Aug., 1886	Sept., 1886	Oct., 1886	Nov., 1886	Dec., 1886	Jan., 1887	Feb., 1887	March, 1887
San Mateo, San Mateo Co.....	0.07	.00	.00	1.69	0.77	0.95	1.21	9.16	0.72
San Miguel, San Luis Obispo Co.....	.00	.00	.00	.00	0.24	0.21	0.52	5.96	0.12
Santa Monica, Los Angeles Co.....	.00	.00	.00	.00	0.10	0.27	0.20	7.07	0.26
San Simon, Cochise Co., Arizona.....	—	0.71	0.09	0.05	0.32	0.30	0.01	0.78	.00
Selma, Fresno Co.....	.00	.00	.00	0.27	0.59	0.60	0.31	2.84	.00
Soledad, Monterey Co.....	0.02	.00	.00	0.32	1.04	0.15	0.34	3.94	0.41
Southside, Los Angeles Co.....	0.17	.00	.00	.00	1.00	0.23	0.14	7.37	.00
Spadra, Los Angeles Co.....	T.	.00	.00	.00	1.05	0.40	0.20	7.36	.00
Stockton, San Joaquin Co.....	.00	.00	.00	0.28	0.75	0.69	0.56	3.30	0.23
Sumner, Kern Co.....	.00	.00	.00	.00	0.60	0.45	0.20	2.23	.00
Summit, Placer Co.....	.00	.00	.00	3.10	1.70	5.75	6.25	20.70	1.40
Suisun, Solano Co.....	.00	.00	.00	0.49	0.22	1.80	0.82	6.37	0.85
Tacoma, Elko Co., Nev.....	0.50	0.40	0.10	0.18	0.22	0.32	1.00	0.88	0.40
Tehachapi, Kern Co.....	0.10	.00	.00	T.	1.15	0.60	0.50	8.88	0.24
Tehama, Tehama Co.....	.00	T.	.00	0.78	T.	2.00	0.33	4.29	1.10
Templeton, San Luis Obispo Co.....	—	—	—	—	—	0.78	0.61	7.21	0.47
Toano, Elko Co., Nev.....	0.11	0.55	0.35	0.78	1.35	0.38	1.18	1.55	0.10
Towles, Placer Co.....	.00	.00	.00	0.80	0.80	3.00	4.35	11.60	1.10
Tracy, San Joaquin Co.....	.00	.00	.00	0.40	0.10	0.50	0.03	2.93	0.29
Truckee, Nevada Co.....	0.89	.00	T	0.85	1.10	2.29	3.43	12.25	0.36
Terrace, Box Elder Co., Utah.....	0.15	.00	0.55	0.05	0.25	0.15	0.32	0.22	0.20
Traver, Tulare Co.....	.00	.00	.00	0.10	0.67	0.95	0.45	3.05	0.32
Tucson, Pima Co., A. T.....	.00	4.94	0.44	0.42	0.45	.00	.00	0.84	.00
Vallejo, Solano Co.....	.00	.00	.00	0.47	0.83	1.77	1.15	7.72	0.46
Winnemucca, Humboldt Co., Nev.....	0.61	.00	.00	1.72	0.73	0.89	0.62	1.71	0.40
Woodland, Yolo Co.....	.00	.00	.00	.00	.00	1.29	0.80	5.38	0.65
Yuma, Yuma Co., A. T.....	.00	.00	.00	.00	.00	.00	.00	.00	.00
Tuohys, Tulare Co.....	T.	.00	.00	0.22	0.85	1.08	0.63	6.61	0.33
Sacramento, Sacramento Co.....	.00	.00	.00	0.56	0.11	1.82	0.75	4.94	0.89
Williams, Colusa Co.....	.00	.00	.00	0.60	.00	0.95	0.35	4.35	1.30
Willows, Colusa Co.....	.00	.00	.00	.00	T.	1.19	0.17	2.77	1.16
Willcox, Grant Co., A. T.....	0.32	2.39	1.40	0.22	0.21	0.01	—	1.44	.00
Wells, Elko Co., Nev.....	0.40	0.20	.00	0.50	0.50	3.25	0.80	1.35	.00
Wadsworth, Washoe Co., Nev.....	.00	.00	.00	2.35	0.18	T.	0.28	2.52	.00
Turlock, Stanislaus Co.....	.00	.00	.00	0.29	0.50	0.55	0.16	2.30	0.36
Tulare, Tulare Co.....	.00	.00	.00	.00	0.55	0.56	0.45	1.98	0.11
Los Angeles, Los Angeles Co.....	.00	.00	.00	.00	1.18	0.26	0.20	8.92	0.22
San Diego, San Diego Co.....	T.	T.	.00	0.05	0.95	0.06	0.04	4.51	0.02
Los Angeles, Los Angeles Co.....	0.27	0.21	0.11	0.02	1.18	0.26	0.20	9.25	0.29
Fresno, Tulare Co.....	.00	.00	.00	0.57	0.80	0.44	0.40	2.79	0.17
Keeler, Inyo Co.....	0.14	0.08	.00	0.01	0.08	.00	T.	0.93	.00
Yuma, A. T.....	T.	2.23	.00	1.11	0.23	.00	.00	T.	.00
Red Bluff, Tehama Co.....	T.	T.	.00	1.76	0.34	3.92	0.59	5.21	1.13
Fort Bidwell.....	0.41	0.04	.00	1.36	1.06	4.25	3.31	4.85	0.97
Eureka, Humboldt Co.....	—	—	1.00	2.00	6.00	9.00	8.86	9.07	2.28
Roseburg, Or.....	2.20	T.	0.33	3.43	2.63	7.30	8.64	6.24	2.58
Portland, Or.....	0.32	0.03	1.19	2.87	1.00	11.52	12.31	2.81	8.00
Olympia, W. T.....	1.15	0.42	3.17	4.15	1.73	13.38	9.83	4.28	10.60
Tatoosh Island.....	6.52	4.70	5.54	7.81	10.44	25.84	14.46	11.30	16.36
Sacramento, Sacramento Co.....	.00	.00	.00	0.68	0.21	1.12	6.28	0.94	2.53
San Francisco, San Francisco Co.....	0.23	.00	0.01	1.48	0.84	2.07	1.90	9.24	0.84

"T"—Trace of precipitation. Amount too small to be measured.

FALL—Continued.

April, 1887	May, 1887	June, 1887	July, 1887	August, 1887	Sept., 1887	Oct., 1887	Nov., 1887	Dec., 1887	Jan., 1888	Feb., 1888	March, 1888	April, 1888	May, 1888	June, 1888
1.68	.00	.00	.00	.00	0.47	.00	1.08	3.44	4.73	1.21	3.97	0.13	0.67	0.08
1.40	0.24	0.26	.00	.00	0.58	0.37	0.49	2.84	4.06	0.13	2.34	.00	0.22	.00
2.47	1.40	.00	.00	.00	0.30	.00	1.13	2.98	6.98	.00	6.95	.00	.00	.00
0.10	.00	.00	.00	.00	0.10	.00	.00	.00	.00	.00	.00	.00	.00	.00
2.60	0.58	.00	.00	.00	.00	0.20	0.16	0.97	2.40	T.	2.57	0.10	0.31	.00
0.54	.00	.00	.00	.00	0.16	.00	0.51	1.47	2.86	0.55	2.10	0.15	0.35	.00
2.55	.00	.00	.00	.00	0.60	1.40	0.50	1.82	2.57	0.82	3.19	.00	6.15	.00
2.17	.00	.00	.00	.00	T.	.00	0.68	2.25	6.23	0.98	3.45	.00	.00	.00
1.37	.00	.00	.00	.00	0.28	.00	0.43	2.69	3.00	0.58	1.74	0.55	0.54	.00
2.04	.00	T.	.00	.00	0.55	0.10	.00	0.69	1.64	1.60	0.31	0.12	0.42	.00
5.80	0.95	1.60	0.10	T.	T.	0.07	1.50	11.60	9.20	.00	8.05	2.30	1.44	3.72
1.74	.00	.00	.00	.00	.00	.00	0.96	2.79	4.30	1.58	3.97	.00	0.65	0.30
0.40	.00	0.10	0.65	0.15	0.40	.00	0.02	0.50	1.18	0.40	0.40	0.20	0.15	0.25
1.95	0.26	.00	.00	.00	.00	0.86	0.26	1.44	2.57	2.60	2.57	1.25	0.25	.00
1.56	0.45	.00	.00	.00	.00	.00	1.56	2.62	4.70	2.40	4.10	0.25	0.25	0.30
1.51	0.06	0.35	.00	.00	0.56	0.24	0.79	3.18	6.05	0.32	5.00	0.38	0.34	0.04
1.12	0.15	0.30	0.86	.00	.00	0.04	0.45	0.82	1.95	0.40	0.95	0.75	0.84	0.19
1.20	T.	.00	T.	.00	.00	.00	0.90	.00	.00	.00	2.80	.00	.00	.00
3.02	.00	.00	.00	.00	T.	.00	0.05	2.43	1.99	0.84	0.61	.00	0.54	0.19
2.00	2.04	0.37	0.41	T.	.00	.00	0.30	4.80	2.35	.00	3.15	0.30	0.70	0.80
0.15	0.09	.00	.00	.00	.00	.00	0.30	0.10	.00	.00	.00	0.01	.00	0.05
2.27	0.70	0.14	.00	.00	0.26	.00	.00	0.97	.00	.00	.00	T.	0.11	.00
0.04	0.27	0.07	4.22	.00	1.99	0.43	0.23	0.07	0.12	0.15	0.68	.00	0.23	0.50
1.90	.00	.00	.00	.00	0.39	.00	0.48	3.06	4.52	.00	0.62	.00	0.45	0.16
1.62	0.44	1.06	0.09	0.13	0.32	.00	.00	1.55	1.37	0.63	0.15	0.20	0.50	0.26
1.53	.00	.00	.00	.00	.00	.00	0.40	3.30	4.25	1.27	2.38	0.10	1.10	.00
.00	.00	0.11	.00	.00	.00	T.	1.92	0.15	0.30	.00	.00	.00	.00	.00
3.15	2.50	.00	T.	.00	T.	.00	.00	.00	.00	.00	.00	.00	.00	.00
1.60	T.	.00	.00	.00	0.01	.00	0.33	2.11	4.42	0.57	2.46	0.13	1.27	0.08
1.28	.00	1.18	.00	.00	.00	.00	0.68	1.31	2.22	0.70	1.72	.00	0.67	0.08
2.78	.00	.00	.00	.00	.00	.00	0.96	2.17	2.99	1.38	1.82	0.08	0.24	0.29
0.08	0.40	0.54	3.51	5.15	2.68	0.45	0.31	0.78	0.75	.00	1.03	T.	0.07	.00
.00	0.05	.00	.00	.00	0.20	.00	0.30	0.70	1.75	0.10	1.35	.00	.00	.00
0.18	0.69	0.52	1.28	0.10	0.15	.00	.00	0.98	0.90	.00	.00	0.10	0.52	.00
1.08	.00	T.	.00	.00	1.00	.00	0.03	1.28	2.19	0.19	1.11	0.18	0.52	.00
1.52	0.90	.00	.00	.00	0.01	0.18	0.05	0.70	2.89	0.19	1.14	.00	1.11	.00
2.02	0.08	0.04	0.03	.00	0.15	0.14	0.85	4.35	7.69	1.17	4.63	.00	.00	.00
2.14	0.47	0.04	0.01	T.	T.	T.	2.08	1.14	2.00	1.50	2.79	0.10	0.22	0.04
2.36	0.20	0.07	0.07	T.	0.18	0.17	0.80	2.68	6.04	0.80	3.17	0.12	0.05	0.01
2.93	0.03	0.07	.00	.00	0.49	0.15	0.32	1.16	1.75	0.19	1.90	2.01	0.56	T.
1.14	0.04	T.	0.52	.00	1.08	0.84	0.01	0.48	0.70	1.21	0.30	0.83	0.30	0.20
0.20	T.	0.01	T.	T.	1.09	0.02	2.43	0.15	0.18	0.05	0.05	T.	.00	.00
1.76	0.77	0.26	T.	T.	0.06	.00	1.52	2.32	4.08	5.33	3.47	0.53	0.51	2.61
1.96	1.47	0.73	0.18	0.21	0.05	.00	0.38	2.40	3.28	1.81	3.28	0.16	1.50	2.38
5.55	3.51	1.92	0.06	0.07	0.21	.00	.00	.00	12.92	1.98	4.09	1.05	0.76	4.66
3.79	1.53	0.99	0.07	0.08	0.51	1.13	3.19	8.89	6.62	2.81	2.39	0.63	1.15	5.94
5.10	4.77	1.44	0.03	0.58	3.06	1.34	3.43	11.34	8.50	2.42	2.87	2.06	0.86	5.38
3.94	5.66	1.01	0.74	0.18	3.34	1.51	4.94	15.75	11.38	2.70	5.96	1.72	0.21	4.80
8.51	8.85	1.12	1.24	1.39	3.43	11.83	10.15	17.47	12.10	11.08	8.65	5.92	2.00	7.44
.00	.00	.00	T.	0.02	.00	0.45	2.09	4.81	4.81	0.57	3.04	0.10	0.40	0.08
2.30	0.06	0.07	T.	0.01	0.29	T.	0.99	3.34	6.61	0.94	3.60	0.11	0.38	0.27

ANNUAL METEOROLOGICAL REVIEW.

Showing the Climatic Condition in all its features for Seventeen Years, from 1871 to 1887, both years inclusive, at San Francisco, California; compiled by Sergeant Nelson Goram, Observer in charge of the local Signal Station.

ANNUAL WEATHER REVIEW FOR YEAR:	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.
Average barometer.....	30.022	30.039	30.029	30.020	30.026	30.007	29.994	29.976	30.033	30.047	30.044	30.060	30.054	30.001	30.028	30.041	30.038
Highest barometer.....	30.42	30.48	30.49	30.41	30.41	30.42	30.42	30.43	30.59	30.49	30.41	30.49	30.67	30.54	30.45	30.40	30.56
Lowest barometer.....	29.53	29.43	29.54	29.55	29.65	29.36	29.66	29.43	29.29	29.48	29.67	29.74	29.63	29.43	29.42	29.32	29.53
Range of barometer.....	0.89	1.05	0.96	0.86	0.76	1.06	0.76	1.00	1.30	1.01	0.74	0.75	0.94	1.11	1.03	1.08	1.03
Average temperature.....	56.3	56.2	55.9	55.7	55.7	56.3	57.3	56.6	56.1	54.2	55.8	54.4	54.7	55.7	56.9	56.1	55.2
Highest temperature.....	84.0	92.0	79.0	89.0	82.0	93.0	92.0	78.0	89.0	83.5	83.0	83.0	95.2	83.0	87.0	93.9	96.9
Lowest temperature.....	42.0	41.0	40.0	39.0	39.0	36.0	42.0	39.0	34.0	37.0	40.0	34.5	35.0	35.0	43.0	41.0	33.1
Range of temperature.....	51.0	51.0	39.0	50.0	43.0	57.0	50.0	39.0	55.0	46.5	43.0	48.5	60.2	48.0	44.0	52.9	63.8
Greatest range of temper- ature.....	33.0	40.0	32.0	39.0	41.0	44.0	41.0	30.0	36.0	38.5	36.0	33.0	44.2	36.0	35.0	43.8	51.3
Least range of tempera- ture.....	16.0	16.0	15.0	19.0	19.0	20.0	18.0	20.0	20.0	19.0	18.0	19.0	20.0	15.5	17.5	22.7	20.9
Average maximum tem- perature.....	73.3	72.6	70.4	72.0	71.5	74.2	74.8	71.0	75.5	71.8	72.0	70.0	75.4	71.5	73.7	77.9	78.8
Average minimum tem- perature.....	47.6	47.6	47.6	46.1	46.2	46.2	48.0	47.2	46.0	44.6	46.6	44.7	45.3	47.2	49.2	45.5	44.7
Average range of temper- ature.....	25.7	25.0	22.8	25.9	25.2	28.0	26.8	23.8	29.5	27.2	25.4	25.2	30.1	24.3	24.5	32.4	34.1
Average humidity.....	75.4	76.1	72.5	72.3	75.6	72.0	72.2	72.9	73.9	75.6	75.8	75.0	78.1	79.5	81.0	75.1	75.4
Average dew point.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47.5	49.1	50.7	47.5	46.8
Prevailing direction of wind.....	S.W.	S.W.	S.W.	S.W.	S.W.	S.W.	W.	S.W.	W.	W.	W.	W.	W.	W.	W.	W.	W.
Total precipitation.....	22.42	22.42	18.56	22.52	22.63	23.54	11.93	33.26	30.76	30.07	23.73	18.67	15.43	38.82	24.90	20.02	19.04
Total movement of wind.....	81.468	81.468	84.201	83.709	85.995	81.618	80.949	79.387	78.575	82.724	83.105	85.554	81.480	78.557	79.194	78.237	80.457
Maximum velocity of wind.....	47	36	48	32	48	44	38	40	40	44	36	36	36	45	36	42	36
Direction at time of max- imum velocity.....	N.W.	W.	S.W.	S.	N.	S.E.	N.	N.	N.E.	N.	W.	N.W.	W.	N.	W.	S.E.	W.
Total number of clear days.....	122	135	134	134	141	179	174	146	159	153	190	156	132	124	116	165	152
Total number of fair days.....	138	133	133	149	160	125	132	142	146	110	126	144	152	148	157	134	140
Total number of cloudy days.....	106	106	97	82	64	62	59	77	60	103	89	65	77	93	92	65	73
Total number of days of precipitation.....	69	64	64	71	58	59	46	75	85	70	65	73	51	83	70	64	60

[illegible]

DAILY NORMAL TEMPERATURE AT SAN FRANCISCO.

The following table of normal temperatures for each day of each month, at San Francisco, as deduced from three daily observations for fifteen years, was furnished by Sergeant Nelson Gorom, the Observer in charge of the San Francisco local Signal Office:

DATE.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1	50.3	52.2	54.4	55.1	56.4	57.9	58.5	59.1	59.8	59.4	57.3	54.7
2	50.7	52.7	54.6	54.7	56.8	57.7	58.4	59.2	60.6	59.2	56.0	53.1
3	50.0	52.4	54.0	54.4	55.6	58.0	58.3	58.3	60.0	60.2	55.9	52.7
4	50.3	52.3	52.7	54.6	55.6	58.9	58.9	58.6	59.9	58.9	57.1	53.6
5	52.3	51.0	54.0	53.5	55.5	60.2	58.4	58.8	59.0	59.0	57.0	54.0
6	51.0	50.6	53.4	53.1	56.0	60.0	58.0	58.9	58.3	59.9	57.7	53.2
7	51.7	50.6	52.9	53.9	57.1	58.7	58.4	58.3	58.6	61.1	58.3	52.6
8	51.3	51.4	52.7	54.9	56.2	58.9	59.0	58.4	58.7	60.5	57.8	51.4
9	50.5	51.5	52.9	54.6	55.3	58.9	58.9	58.6	58.9	59.2	57.7	50.8
10	50.3	51.1	53.1	53.9	55.4	59.1	58.8	58.7	59.8	59.9	56.1	50.9
11	49.3	50.7	53.7	54.0	55.4	60.0	58.9	57.9	60.3	60.0	56.1	50.5
12	48.5	51.0	53.6	53.8	54.7	60.0	59.4	57.8	60.4	58.9	55.4	50.3
13	49.2	51.6	52.5	53.1	54.7	58.7	58.9	58.1	60.7	57.3	55.4	51.0
14	50.7	51.1	52.7	54.3	54.8	57.4	58.7	58.5	61.0	57.9	56.3	51.7
15	50.2	51.8	52.9	54.7	55.1	57.7	58.8	58.2	60.0	58.9	55.9	51.6
16	51.0	52.0	52.6	53.8	55.7	57.8	58.7	57.6	59.9	59.5	56.0	51.0
17	50.4	51.7	52.8	53.9	55.6	57.9	58.2	58.2	59.6	61.4	55.5	50.2
18	50.3	50.9	54.5	53.6	56.5	58.6	57.6	58.5	58.9	61.3	54.8	51.2
19	51.2	51.6	54.2	54.0	56.7	59.2	57.6	57.8	59.7	59.9	54.1	52.3
20	49.9	53.0	54.1	53.9	56.1	59.6	57.8	57.3	60.8	59.9	55.1	52.3
21	50.0	53.6	53.9	55.2	56.4	57.7	57.6	57.9	61.7	59.4	55.7	51.9
22	51.3	53.8	54.6	55.8	56.3	58.2	57.7	58.1	60.3	59.2	56.1	51.9
23	51.1	53.8	54.0	56.5	57.3	58.1	57.7	58.2	59.8	58.8	55.7	52.4
24	50.8	52.4	54.6	56.1	58.0	56.9	57.9	59.2	59.6	58.2	54.0	53.3
25	50.9	52.7	54.5	54.4	58.7	57.2	57.9	58.8	61.2	58.5	53.9	52.7
26	50.3	53.3	55.5	54.4	58.0	58.6	58.8	59.2	58.8	59.7	53.4	51.5
27	50.5	52.9	55.6	54.9	57.9	57.0	58.7	59.6	59.0	58.8	54.2	51.5
28	50.6	52.6	54.5	55.8	57.1	57.6	58.6	59.1	60.0	58.0	54.4	51.5
29	51.5	51.5	54.7	55.2	57.4	58.2	58.8	59.6	59.9	57.7	55.6	51.1
30	51.4	-----	53.9	55.7	58.5	58.1	58.6	60.5	58.9	57.2	55.0	49.9
31	51.5	-----	54.6	-----	58.7	-----	59.5	59.3	-----	57.6	-----	49.7
Monthly	50.6	52.0	53.8	54.5	56.4	58.4	58.5	58.6	59.8	59.2	55.8	51.8

RED BLUFF WEATHER FROM 1877 TO 1887.

From the Signal Office records, and taken from the annual meteorological review of the State of California, by Sergeant James A. Barwick, Observer:

ANNUAL WEATHER REVIEW FOR:	1877.*	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.
Average barometer		29.58	29.64	29.65	29.65	29.84	29.67	29.62	29.65	29.65	29.64
Highest barometer	30.03	30.14	30.30	30.14	30.12	30.14	30.34	30.22	30.09	30.10	30.14
Lowest barometer	29.23	29.00	28.97	29.03	29.19	29.30	29.21	28.88	29.07	28.99	29.08
Range of barometer		1.14	1.32	1.11	.93	.85	1.13	1.24	1.02	1.11	1.06
Average temperature		64.0	63.3	61.2	62.1	60.2	61.5	60.8	64.4	63.2	64.4
Highest temperature	108.0	110.5	110.0	108.0	103.0	106.0	107.0	107.0	108.0	109.0	111.5
Lowest temperature	32.0	25.0	25.0	26.0	31.0	25.0	19.0	22.0	33.0	30.0	27.3
Range of temperature		85.5	85.0	82.0	72.0	80.0	88.0	85.0	75.0	79.0	84.2
Greatest monthly range of temperature	54.0	55.0	54.0	53.5	53.0	57.0	58.0	57.0	56.0	54.4	70.4
Least monthly range of temperature	34.0	25.0	36.0	27.5	32.5	30.0	39.0	35.5	32.5	34.5	35.9
Average maximum temperature		86.9	89.2	86.7	86.0	83.7	87.2	72.0	76.3	76.2	75.6
Average minimum temperature		41.4	41.3	39.8	41.1	39.5	39.8	49.7	52.8	52.4	51.4
Average range of temperature		45.5	47.8	47.0	45.1	43.9	47.3	44.0	44.8	46.6	50.0
Average humidity		53.2	52.5	51.4	55.1	58.0	55.1	59.3	57.5	55.3	47.0
Average dew point							41.5	43.5	45.2	42.8	39.5
Prevailing direction of wind	N.	N.	N.	N.	N.	N.	N.	S.	S.	N.	N.
Total precipitation	8.54	49.01	33.64	26.53	24.93	21.82	13.76	28.06	29.63	17.21	13.60
Total velocity of wind	28,806	70,220	a	620,379	49,088	45,879	54,948	58,145	51,924	54,690	63,705
Maximum velocity of wind	30	46	52	60	42	40	36	48	44	50	45
Direction at time of maximum velocity	N.	S.E.	S.	S.E.	S.	S.	S.	S.	S.	S.E.	N.
Total number of clear days	128	232	207	230	204	215	261	225	223	212	213
Total number of fair days	32	72	90	74	103	89	67	84	96	91	98
Total number of cloudy days	24	61	68	55	58	43	37	53	46	59	54
Total number of foggy days	a	a	a	a	0	0	5	0	2	2	0
Total number of days of precipitation	27	79	83	66	72	69	44	71	70	63	57
Number of earthquakes	0	2	0	0	2	0	0	1	0	0	2
Snow storms	a	a	a	a	a	0	0	1	0	1	2
Thunder and lightning	a	a	a	a	a	7	7	7	7	3	5
Number of solar halos	a	a	a	a	4	9	0	0	0	0	2
Number of lunar halos	a	a	a	a	3	2	3	5	2	14	14
Number of light frosts	a	a	a	a	17	19	9	21	16	14	10
Number of killing frosts	a	a	a	a	4	10	37	15	3	6	18
Number of days maximum temperature above 90°	69	93	84	71	59	60	94	53	77	89	99
Number of days minimum temperature below 32°	0	12	16	26	1	17	33	15	0	7	12
Highest water in the river during each year					c28.6	c12.0	c13.0	c21.0	d21.1	d20.5	d18.3
Lowest water in the river during each year					c1.1	c0.10	c0.6	c0.10	d0.3	d0.3	d0.4
Range of water in the river					c27.5	c11.2	c12.6	d20.2	d20.8	d20.2	d17.9

*Station opened July 1, 1877—Six months, 1877. a No record. b Five months. c Feet and inches. d Feet and tenths.

RAINFALL AT RED BLUFF.

This table is made up from the Signal Service records, and shows the total rainfall for each calendar year from 1878 to date, and the rainfall by seasons from 1877-78 to date; also the totals for each month, with the averages from the opening of the Signal Office on July 1, 1877, to date:

YEAR.	January	February	March	April	May	June	July	August	September	October	November	December	Total for Year	Season of	Total for Season
1877							.05	.03	none	1.35	3.13	3.98			
1878	20.71	16.66	4.16	2.21	.89	none	none	none	.42	1.56	1.66	.69	48.96	1877-78	53.17
1879	3.18	3.67	5.39	2.12	2.18	.30	.04	.28	spring	.48	6.06	9.96	33.64	1878-79	21.17
1880	2.01	1.66	1.70	7.05	1.04	none	none	none	none	.08	14	12.85	26.53	1879-80	30.26
1881	9.40	2.79	.51	1.83	.79	.51	spring	none	1.07	1.81	.73	5.69	24.93	1880-81	28.90
1882	2.81	3.94	2.67	2.12	.38	.15	none	none	.49	2.80	5.07	1.44	21.82	1881-82	21.12
1883	.87	.39	2.80	1.96	2.96	none	none	none	1.04	2.68	.74	.52	13.76	1882-83	18.58
1884	3.55	2.21	7.81	4.31	.18	.97	none	none	.36	.90	.04	7.73	28.06	1883-84	24.01
1885	1.84	1.19	spring	.62	.64	1.37	.06	none	2.91	.10	17.05	3.90	29.67	1884-85	14.69
1886	4.80	.18	1.31	4.12	.73	spring	spring	spring	none	1.76	.34	3.94	17.18	1885-86	65.15
1887	.57	5.21	1.13	1.76	.77	.26	spring	spring	.06	none	1.52	2.32	13.60	1886-87	15.74
Totals	49.74	37.90	27.28	28.10	10.51	3.56	.14	.31	6.35	13.32	36.47	53.01	238.15		252.79
Avg's	4.974	3.790	2.728	2.810	1.051	.356	.013	.028	.577	1.211	3.315	4.819	33.815		25.279

The following table gives the average highest and lowest temperature, and the total rainfall for each year from 1878 to 1888, also the highest and lowest temperature from the railroad records from 1875 to 1877, both years included:

YEARS.	Highest Temperature.	Lowest Temperature.	Clear Days.	Fair Days.	Cloudy Days.	Days .01 Inch or More of Precipitation.	Total Yearly Precipitation, Inches.
*1875	104	33					26.10
*1876	106	35					18.75
*1877	112	40					10.12
†1878	103	30	141	160	66	54	20.86
†1879	104	30	173	146	36	48	17.41
†1880	97	30	141	171	54	51	18.65
†1881	102	34	172	154	39	24	5.53
†1882	100	32	197	109	41	39	10.74
†1883	104	28	183	143	29	33	14.14
†1884	102	34	189	110	67	71	40.39
†1885	108	36	181	145	38	26	10.06
†1886	98	32	190	131	43	32	17.20
†1887	100	33	196	129	39	36	16.19

* Railroad record. † Signal Service record.

CLIMATE OF CALIFORNIA BRIEFLY DESCRIBED.

There are essentially two climates in California. The land climate and the sea climate. The latter derives its low temperature from the ocean, the water of which, along the coast, stands at from 52 to 54 degrees all the year round. The evenness of the ocean temperature is owing to a steady current from the north, which is accompanied also by winds in the same direction during the entire summer season, or rather from April to October, inclusive.

Almost daily, during this period, a deluge of cold, damp air, of the same temperature as the ocean over which it has passed, is poured upon the land. It is mostly laden with mists in dense clouds, which it deposits at the foot-hills and on the slopes of the highlands, or carries a short distance into the interior, wherever there is a break in the land wall.

The land climate is as nearly as possible the opposite in every respect. In summer and autumn it is hot and dry. It undergoes various modifications from the configuration of the surface of the earth. Even the mountains, which retain the snow to a late period, present a high temperature in the middle of the day, and the presence of snow on their summits in June is owing to the great mass which has accumulated on them, rather than to cold weather. A large district of territory lies between the jurisdiction of the two climates and subject to their joint influence. It is composed chiefly of valleys surrounding the bay of San Francisco and penetrating into the interior in every direction. There is no climate in the world more delightful than these valleys enjoy, and no territory more productive. Whilst the ocean prevents the contiguous land from being scorched in summer, it also prevents it being frozen in winter. Hence ice and snow are not common in the ocean climate.

The difference in temperature is comparatively slight between summer and winter. The absence of warm weather in the summer months is characteristic of the coast climate, and strikes a stranger forcibly. The most ordinary programme of this climate for the year is as follows, beginning with the rainy season: The first decided rains are in November or December, when the country, after having been parched with drought, puts on the garb of spring. In January the rains abate, and vegetation advances slowly, with occasional slight frosts. February is spring-like, with but little rain. March and April are pleasant and showery, with an occasional hot day. In May the sea breeze begins, but does not give much annoyance. In June, just as warm weather is about to set in, the sea breeze comes daily, and keeps down the temperature—it continues through July and August, occasionally holding up for a day or two, permitting the sun to heat the air to a sweating point. In September the sea wind moderates, and there is a slight taste of summer, which is prolonged into the next month. The pleasant weather often lingers in the lap of winter, and is interrupted only by the rains of November or December.

Though the nights in the interior are not so uniformly cool, yet there are few localities, even in the valleys, where they are too warm for sleeping, even though the day temperature may have reached 100 degrees. This is a remarkable feature of the climate of the Pacific States, and it has an important bearing on the health, vigor, and character of the population. In speaking of the "rainy season," strangers will not infer that the rain is perpetual, or nearly so, during that time. The term is employed only in contrast with the dry season, and it implies the possibility rather than the actual occurrence of rain. In more than half the winters there is not a drop beyond the necessities of agriculture, and even in the seasons of most rain much pleasant weather is interspersed. If the winter be not extraordinary, it is generally regarded as the most pleasant season of the year. In the intervals of rain, it is bright, sunny, and calm. It is spring rather than winter. The grass starts as soon as the soil is wet. At Christmas, nature wears her green uniform almost throughout the entire State, and in February and March it is set with floral jewels. The blossoms increase in variety and profusion until April, when they are so abundant in many places as to show distinctly the yellow carpeting on hills five miles distant.

In the Atlantic States the storms of approaching winter put a stop to

the labors of the farm, and force both man and beast into winter quarters. In California it is just the reverse. The husbandman watches the skies with impatient hope, and as soon as the rains of November and December have softened the soil, every plow is put in requisition. Nothing short of excess or deficiency of rain interferes with winter farming. The planting season continues late, extending from November to April, giving an average of nearly six months for plowing and sowing, during which the weather is not likely to interfere with outdoor work more than in the six spring and summer months of the Eastern States. Owing to the absence of rain, harvesting is conducted, which would confuse the ideas of an Atlantic farmer. There are no showers or thunder gusts to throw down the grain, or wet the hay, or impede the reaper. The hay dries in the swath without turning. The grain remains standing in the field awaiting the reaping machine, it may be, for a month after it is ready to cut—and so it remains when cut, awaiting the thrasher. When thrashed and sacked, the sacks are sometimes piled up in the field a long time before removal. In September or October the great grain-growing valleys may often be seen dotted over with cords of grain in sacks, as secure from danger from the weather as if securely housed. Owing to the absence of severe frosts, the gardens around San Francisco supply fresh vegetables all through the winter. New potatoes often make their appearance in March. In May the potatoes are full grown, and the largest weigh a pound or more. Many of the interior valleys are subject to malarious fevers, but not generally of a severe type. The various forms of disease which prevail elsewhere are found here, but they present no peculiarities worthy of comment. Insanity and diseases of the heart and blood vessels are frequent, but this is due rather to moral and physical causes than to climatic influence. The relation of the climate to pulmonary affections presents its most important aspect. Many persons threatened with lung disease, or but slightly affected by it, have regained their health completely by immigration to this State.

THE SACRAMENTO VALLEY.

It would be impossible in this brief space to give an exhaustive description of our great valley, or even to fully outline the characteristics which long since placed this part of California on a footing with the most favorable localities of the continent. Aside from its geographical peculiarities, which are fast giving us an enviable reputation at home and abroad, this section is rich in historical reminiscences.

These date from the earliest pioneer times—the days of the unfortunate Donner party, and of the generous Captain John A. Sutter—the days when placer mining was the chief industry, and the whims of the people the law, to the present, when we find in the “great valley” the industries of refined culture, and a development resting upon sobriety, energy, and intelligence. In fact, the history of Northern California is pregnant with all the variety of items which go to show the steady advancement necessary to a sure, sturdy, and independent growth of one of the most interesting sections of our great commonwealth. But these must be passed, at least for the present.

The valley proper is one of the largest of its class in the world, and extends from Shasta County on the north to San Joaquin on the south, and is limited on the east and west only by the lofty mountain ranges, whose snow-capped peaks point skyward; fit emblems of their supremacy. To the northward, and plainly visible for one hundred miles, Mount Shasta

rises heavenward nearly fifteen thousand feet, and is second in altitude in the United States.

The Sacramento River, the largest stream in the State, traverses the valley from north to south, and is the natural line of commerce. Tributaries from the Sierra Nevada and Coast Range flow into the Sacramento on either side, and are, in some instances, themselves navigable. The Sacramento rises in the extreme north, and flows southward to Suisun Bay, from which, by San Pablo and San Francisco Bays, it has communication with the Pacific Ocean. A feature particularly noticeable from the geographer's standpoint, and not without interest to the intelligent home-seeker, is the fact that the streams of the valley, after reaching the plains, follow the higher sections, thereby furnishing unequaled facilities for irrigation. The artificial watering of crops has not heretofore been considered necessary, but is deemed of value in a few special instances.

The valley for a quarter of a century has been devoted to agriculture, and until recently almost exclusively to grain raising. From the first it was found that wheat growing was remunerative employment, and with that, content with good enough, which was so common a characteristic of the pioneer immigrant, no loftier ambition was stimulated. And, notwithstanding the discouraging depression of the grain markets in previous years, there never has been a time when the thrifty farmer could not meet his liabilities, and point to a little surplus he could call his own. Of late years, however, considerable attention has been devoted to fruit raising, and now large shipments are daily made, through the fruit season, to San Francisco and eastern markets. The fruit produced is of excellent quality, both as regards appearance and flavor, which fact is abundantly attested by the awards in its favor lately made, when brought into competition with similar products from other sections. As immigrants from the East and Europe arrive, a large proportion at once enter into horticultural pursuits, and are amply rewarded. Lately much attention has been devoted to the citrus fruits, and already our oranges and lemons rank favorably with the products of the older countries.

Although the Sacramento Valley has long been settled, and for the most part made subject to continual tillage, there is yet room for development; and as fruit interests gain in strength, and small farming is consequently encouraged, there will be room for thousands where now are hundreds, and the wealth of the country will be correspondingly increased. In this connection it may be interesting to know what lands are subject to cultivation. A good authority gives the following estimate: Plain land, 4,000,000 acres; foothills proper, 4,500,000 acres; upper foothills, 4,000,000 acres; mountains, between 1,000 and 2,000 feet elevation, 6,000,000 acres, making the total acreage of the land described 18,500,000 acres.

A few of the cities and larger towns may be mentioned briefly. On the direct route of commercial traffic is Sacramento, a large and flourishing city, the capital of the State, and the seat of numerous institutions of the arts, sciences, and learning; Marysville, the center of vast agricultural districts, which has direct commercial connection with the outside world by water and by rail, as well as the home of several noted factories and institutions of learning; Chico, now one of the most prosperous little cities in the State, and the location of the new Normal School; Oroville, with its colonies and orange groves, and others of which we cannot even speak.

The best evidences, however, of the possibility of the Sacramento Valley, are shown by the interest manifested by those who visit us, and have already cast their lot with ours.

Foreign Temperature, by Sir James Clark, with Palermo, Algiers, and Mentone added to the table by Dr. Henry Bennett, from whose work, "Winter and Spring on the Shores of the Mediterranean," the following table was taken:

NAME OF PLACE.	MEAN TEMPERATURE OF MONTHS.												MEAN TEMPERATURE OF SEASONS.				Mean Annual Temperature.
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Winter.	Spring.	Summer.	Autumn.	
Cairo	58.1	56.1	64.6	77.9	78.3	83.7	85.8	85.8	79.2	72.3	63.0	61.3	58.5	73.6	85.1	71.5	72.2
Santa Cruz (Canaries)	63.8	64.3	67.2	67.3	72.1	73.9	77.3	78.9	77.4	74.7	70.4	65.8	64.6	68.9	76.7	74.2	70.9
Ceylon (Hill District)	69.2	66.5	70.8	72.7	71.4	68.4	69.8	68.9	70.8	70.9	70.6	69.7	69.3	70.8	69.5	71.3	70.2
Malta	56.5	56.3	58.1	61.8	67.4	73.8	79.6	81.2	77.8	71.1	64.2	59.6	57.5	62.8	78.2	71.0	67.3
Corfu	52.6	51.8	54.6	58.3	66.7	72.3	77.7	81.3	78.3	70.8	63.8	58.4	54.3	59.8	77.1	71.0	65.6
Madeira	59.7	60.3	61.9	62.0	63.4	66.9	70.0	71.9	71.3	68.8	64.0	61.4	60.6	62.4	69.6	67.3	65.0
Palermo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	53.1	59.3	74.7	66.8	64.4
Algiers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	55.0	66.0	77.0	64.0	62.9
Port Jackson (N. S. W.)	61.7	71.6	69.6	64.0	59.7	54.9	53.9	55.3	59.3	63.5	67.7	69.2	54.6	63.4	70.9	60.0	64.0
Cadiz	51.4	53.7	55.2	59.6	63.8	68.2	70.3	72.9	70.2	67.1	58.8	53.6	52.9	59.5	70.4	65.4	62.9
St. Michael's (Azores)	59.0	59.0	59.5	61.0	63.0	67.0	68.0	70.0	68.0	63.0	56.0	55.6	57.8	61.2	68.3	62.3	62.4
Naples	46.5	48.5	52.0	57.0	66.5	71.0	75.0	78.5	72.5	63.0	54.5	50.5	48.5	58.5	70.8	64.5	61.4
Mentone	48.2	48.5	52.0	57.2	63.0	70.0	75.0	75.0	69.0	64.0	54.0	49.0	48.9	60.0	73.0	55.6	60.8
*San Remo	47.2	50.2	52.0	57.0	62.9	69.2	74.3	73.8	70.6	61.8	53.3	49.3	48.9	57.3	72.4	61.9	60.2
Rome	47.6	49.4	52.0	56.4	64.5	69.2	73.3	74.0	69.5	63.6	58.8	49.6	48.9	57.6	72.2	64.0	60.7
Pisa	44.0	48.1	51.5	56.3	63.8	70.6	77.5	77.5	73.5	62.6	52.3	47.0	46.0	57.2	75.2	62.8	60.6
Genoa	41.6	47.5	51.1	60.3	64.4	73.5	75.1	76.5	73.2	64.7	51.0	45.6	44.6	58.6	75.0	62.9	60.4
Toulon	40.0	44.0	48.0	55.0	68.0	70.0	74.0	79.0	64.0	62.0	51.0	46.0	43.3	53.7	74.3	59.0	59.9
Marseilles	54.8	45.1	49.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	45.5	57.6	72.5	60.1	59.5
Nice	45.8	49.0	51.4	57.0	63.0	69.0	73.6	74.3	69.4	61.8	53.7	48.6	47.3	56.2	72.3	61.6	59.5
Florence	41.0	45.0	48.0	56.0	64.0	69.0	77.0	76.0	70.0	59.0	53.0	47.0	44.8	56.0	74.0	60.7	59.0
Port Philip (N. S. W.)	67.6	68.9	65.7	58.6	55.6	50.9	49.2	50.1	54.5	58.2	62.5	65.9	50.1	58.4	67.5	60.0	59.0
Auckland (N. Z.)	67.9	67.3	64.2	60.5	54.7	51.4	49.0	51.7	54.0	56.4	60.1	63.9	50.7	56.8	68.4	59.8	58.4
Avignon	42.0	43.5	50.5	55.0	66.0	72.0	76.0	76.0	67.0	60.0	50.0	43.3	42.6	57.1	74.7	59.0	58.2
Montpellier	42.0	45.0	47.0	53.0	60.0	67.0	72.0	75.0	71.0	61.0	52.0	46.0	44.2	53.3	71.3	61.3	57.6
Pau	41.2	43.6	48.8	51.8	61.6	68.2	70.6	73.4	67.4	58.2	46.6	42.8	41.8	54.1	70.7	57.4	56.2
Sienna	39.7	40.2	46.2	53.7	62.4	67.5	72.8	72.3	66.0	58.3	47.1	41.7	40.5	54.1	70.8	57.1	55.6
Baths of Lucca	.....	.....	.....	53.0	60.5	63.0	70.0	71.5	66.6	.....	.....	.....	.....	.....	68.2	.....	55.0
Paris	35.6	40.5	43.5	49.6	58.1	62.5	65.7	65.2	60.4	52.4	44.2	39.2	38.4	50.4	64.5	52.3	51.5
*Cannes	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	49.6	51.4	73.0	61.0	59.9
*Valencia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50.7	63.0	75.3	66.0	63.8
*Gibraltar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58.0	66.0	77.0	67.0	64.0
*Lisbon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	54.0	59.0	68.0	61.0	61.0
*Mexico	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	53.6	63.4	65.2	60.1	60.6
*Jerusalem	49.4	54.4	55.7	61.4	73.8	75.2	79.1	79.3	77.0	74.2	63.8	54.5	52.8	63.6	77.9	71.7	66.5

* Add.d to the table by Sergeant Barwick.

AVERAGE TEMPERATURE, HIGHEST AND LOWEST TEMPERATURE, AND AVERAGE RAINFALL AT PROMINENT POINTS IN CALIFORNIA.

The following table shows the average temperature for the winter, spring, summer, and autumn; also the highest and lowest temperature and the average precipitation at the most prominent and well known points in California. This table makes it possible to compare different places in California with the table of foreign temperature that precedes this one.

NAME OF PLACE.	Average Winter Temperature	Average Spring Temperature	Average Summer Temperature	Average Autumn Temperature	Average Annual Temperature	Highest Tempera- ture	Lowest Tempera- ture	Average Precipita- tion—Inches
Redding	47.8	61.1	81.0	65.3	63.8	110	18	36.66
Red Bluff	46.8	59.8	79.7	63.2	62.4	110	16	27.46
Chico	47.3	62.4	81.3	64.2	63.8	110	18	20.84
Oroville	52.0	64.5	78.8	64.3	64.9	102	20	22.11
Marysville	50.1	62.7	78.3	65.6	64.2	108	18	16.60
Auburn	46.2	56.4	74.3	61.7	59.7	106	13	33.15
Sacramento	48.3	59.5	71.6	61.6	60.2	108	19	19.80
Woodland	48.3	61.6	77.7	63.8	62.8	106	19	16.60
Stockton	48.1	59.7	72.3	61.7	60.5	110	18	13.54
San Francisco	51.3	54.6	58.5	58.2	55.7	95	33	24.25
Petaluma	48.2	55.9	64.2	57.7	56.5	103	18	22.32
Oakland	49.8	55.3	60.5	56.7	55.6	103	25	24.54
Napa	48.9	59.6	69.6	59.1	59.3	104	18	23.36
San José	49.2	56.6	66.2	58.9	58.0	108	24	12.95
Santa Cruz	51.8	57.7	62.2	59.6	57.8	98	30	25.88
Monterey	50.9	56.7	61.6	57.1	56.6	90	25	14.96
Fresno	50.2	64.9	84.1	67.6	66.7	115	18	9.57
Visalia	45.4	59.4	80.8	60.3	61.5	106	18	9.82
Sumner	49.6	65.0	85.1	65.5	66.3	113	18	5.02
Santa Barbara	54.3	59.4	67.7	63.1	61.1	102	28	16.92
Los Angeles	53.6	58.4	67.8	62.7	60.6	112	28	17.64
Anaheim	56.0	64.3	73.1	66.7	65.0	108	25	11.01
Newhall	48.3	58.9	74.0	62.3	60.9	114	18	14.63
Riverside	50.4	64.1	73.7	65.7	63.5	105	25	8.16
Colton	52.0	62.7	78.3	65.3	64.6	116	18	9.84
Poway	50.7	57.6	68.8	60.8	59.5	110	21	14.15
San Diego	54.6	58.1	66.8	62.6	60.5	101	32	11.01

CLIMATIC COMPARISONS OF SANTA BARBARA WITH THAT OF SAN REMO AND MENTONE.

By Sergeant JAMES A. BARWICK, Observer Signal Corps, Sacramento, California.

Mentone and San Remo's climate, compared with Santa Barbara during each month of the year, shows that that of Santa Barbara is far superior as a summer and winter resort. The summers of San Remo and Mentone are as hot as those of the Sacramento and San Joaquin Valleys, and therefore cannot compare favorably with Santa Barbara, which has the finest and best summer temperature of any place on the Pacific Coast. The following temperature tables of Santa Barbara were compiled from Mr. Hugh D. Vail's records for 1885, 1886, and 1887, and is the average of these years. Those at Mentone are from M. de Brae's record of ten years. They are a valuable addition to tables already published for comparison with the California climate. Santa Barbara will be seen to far excel either San Remo or Mentone as a winter resort. Comparing Santa Barbara in summer, with the Italian climate, is simply a waste of words and space; for the table of comparison tells more plainly and more eloquently the great superiority of the climate of Santa Barbara over the places mentioned. The table is as follows:

Santa Barbara, Mentone, and San Remo's Comparative Temperature Tables.

MONTHS.	Mean Average Monthly Temperature at Santa Barbara.	Mean Average Monthly Temperature at Mentone, France.	Mean Average Monthly Temperature at San Remo, Italy.
January.....	54.3	48.2	47.2
February.....	55.6	48.5	50.2
March.....	56.4	52.0	52.0
April.....	58.3	57.2	57.0
May.....	60.2	63.0	62.9
June.....	62.6	70.0	69.2
July.....	65.7	75.0	74.3
August.....	67.0	75.0	73.8
September.....	65.6	69.0	70.6
October.....	62.1	64.0	61.8
November.....	58.0	54.0	53.3
December.....	55.3	49.0	49.3
Average for twelve months..	60.1	60.4	60.1

The lowest temperature ever recorded at Santa Barbara was 28.5 degrees, during the cold wave of January, 1888; while an acknowledged minimum temperature in ten years at Mentone has been recorded as 32 degrees. But Mr. Bennett in his book says: "In more severe winters I have repeatedly known the thermometer to descend below 32 degrees several nights consecutively, near the seashore, and at the outlet of the torrent beds, especially in the western bay. Slight films of ice then form on shallow pools on the road and near the torrents."

This has occurred at Santa Barbara upon but one night, and not as at Mentone several nights consecutively. The above table is one of the strongest advocates for Santa Barbara as being the very best winter climate in the

northern hemisphere from year to year and month to month. Dr. Bennett says of Mentone, speaking of the ten years' mean obtained by him from 1859 to 1869 for six months each year, and those obtained by M. de Brea's ten years' record from 1850 to 1860, that such results show how very uniform the climate of Mentone is, especially when a sufficiently large number of years are thus compared. Now, if Dr. Bennett thinks the climate of Mentone so very uniform, what would he think of the comparison as above with Santa Barbara; the latter's mean yearly temperature as deduced from ten years of observation by different parties, with observations at different hours, is 60.2 degrees, while in the above table the mean for each month and the year are the average of the three years—that of 1885, 1886, and 1887, and are the same as that made by other parties. It ought to do a Californian good to look at each month of the above table, and see how much warmer the Santa Barbara climate is in the winter, spring, and fall, and how much cooler it is in the summer than the far famed and much advertised Mentone and San Remo. Santa Barbara had two hundred and fourteen clear days out of two hundred and eighty-nine that were observed during 1887 by Mr. Hugh D. Vail, from whose records the above facts are obtained. Mentone and San Remo has but an average of two hundred and fourteen clear days out of three hundred and sixty-five. This comparison speaks much, yes, very much indeed, for Santa Barbara—not only as a winter resort but a summer resort as well. Mentone and San Remo have about as hot a summer temperature as does Riverside and the Sacramento and San Joaquin Valleys, and being much more moist than the California points mentioned, would make an atmosphere of almost suffocation, like New York, Philadelphia, and other eastern cities.

IRRIGATION AND FORESTRY CONSIDERED IN CONNECTION WITH MALARIAL DISEASES.

By H. S. ORME, M.D., President of the State Board of Health.

The subject of irrigation in a sanitary point of view has for some time occupied the attention of physicians and other scientists. It is a subject upon which opinions differ, and in a country where the system is so extensively practiced as in California, it becomes of the first importance to ascertain its effects upon the general health of the population. The study is an interesting one to the sanitarian, on account of the different effects observed in the different localities.

Irrigation has been practiced in California since the establishment of the early Missions, more than a century ago; but little improvement has been made in the application of the system, the object of the cultivator being to get the water upon his land without regard to the methods employed. The establishment of irrigation companies, however, bids fair to remedy this evil, and careful investigation and scientific research will doubtless soon develop the best methods of irrigation and their proper application to different localities. I have thus far personally investigated this subject only in the locality in which I reside (Los Angeles and vicinity), and the result of my observations convinces me that no evil effects are to be dreaded from irrigation *when properly conducted*. The higher lands, when planted with trees and vines and well irrigated, show no traces of malarial influence. The soil, being a gravelly loam, readily absorbs the moisture, and the conformation of the land affords ready surface and subsoil drainage.

It is mostly on alluvial lands that evidences of malaria are manifest. In some sections along river banks the soil, fertile with humus (the dead matter of prior vegetation), is charged with the elements of malaria, which only await a summer temperature above 60 degrees and an upturning of the surface to induce that poisonous fermentation which destroys health and endangers life. Such regions, however, are limited, and wherever the character of the land renders it susceptible of drainage, the evidences of malaria disappear. In many instances, where diseases are attributed to malarial influences, I am convinced that the true source of the evil lies in the habits of the people and the disregard of sanitary laws. Improper food and clothing, reckless exposure, the use of surface water for drinking purposes, and, above all, personal uncleanness, will engender diseases closely allied to those produced by malaria, and these conditions are too often to be found among the lower classes of our people. It is undoubtedly a fact that the distribution of large quantities of water over a great extent of land surface, and allowing it to stagnate, is an active agent in producing malarial diseases. For example, the willow swamps adjoining the south end of Tulare Lake in 1860, 1864, and 1868 were great hotbeds of malaria. During the heavy winter rains hundreds of acres were overflowed, and remained for months great, stagnant lakes, poisoning the air with their deadly exhalations, fatal as those of the upas tree. *Irrigation, in order to be innocuous, must go hand in hand with drainage.* This fact has been demonstrated time after time, by the drainage and cultivation of

marshes whose noxious exhalations had previously rendered their vicinity uninhabitable, but which, after drainage and cultivation, became healthful and fertile lands. These results are due to the removal of the superabundant moisture and the conversion of the decomposing organic matter into plant food.

The rainfall of the past few years, especially in the southern portion of the State, has been greater than usual. We may, therefore, look for an increase of malarial diseases, especially upon the low, flat lands, during the ensuing summer and autumn. The upland sections will probably not be affected, owing to the porosity of the soil and consequent subdrainage. From the fact that localities having all the natural conditions that indicate malaria, such as uplands remote from the sea, shut out from the health-giving influence of the prevailing winds by ranges of intervening hills, and having a high summer temperature, with abundant irrigation, exhibit no symptoms of malaria, while lands nearer the ocean, upon the open plain, exposed to the full force of the daily sea breeze, and where one would naturally least expect to encounter malarial influence, often develop it in a virulent form, is conclusive proof, to my mind, that the exemption of the first named localities is due to ample drainage, and the malarious character of the second may be attributed to the want of it. When the question of irrigation becomes thoroughly understood, and is practiced upon scientific principles, there will, in my opinion, be little danger from this source. This will doubtless be accomplished, as I have before stated, under the influence of the irrigation companies or societies already formed, and who are giving the subject their earnest attention, both in an economic and sanitary point of view. In this relation the "West American Scientist," in an article on "Forest Influence on Climate," in a paper read before the Royal Meteorological Society of London, by Dr. Woeikof, states that the first scientific investigation of the influence of forests upon climate was made by the establishment of the Bavarian forest meteorological stations. Germany, France, Switzerland, Italy, and other countries followed this example. In general it has been found that during the warmer season the air and earth temperatures are lower in the forest than in the neighboring woodless localities; that their variation is less, and that the relative humidity is greater. A discussion of this question shows that forests materially influence the temperature of neighboring localities, and that they cause the summer to be cooler in regions situated further in the interior than those nearer the sea. Hence forests exert an influence upon climate which does not cease at their borders, but is felt over a greater or less district, according to the size, kind, and position of the forests. Thus climate may be affected by the planting or destruction of forests.

Therefore, in this connection the subject of forestry or arbor-culture may be properly considered as prophylactic to malarial or miasmatic diseases. It is a well established fact that in malarial districts the planting of shrubs and trees has had the effect to greatly modify, if not entirely remove, the malarious influence. The *Helianthus*, or sun flower, which possesses superior power as an absorbent, has been successfully used in various localities, notably in the marshes near the Federal Capitol, once reported so prolific of malignant fevers. The bayous and lagoons formed by the inundations of the Mississippi River in Louisiana would naturally be regarded as the headquarters of malaria, yet this district enjoys a comparative immunity from malignant fevers, owing, it is believed, to the influence of a large flowering aquatic plant, belonging to the natural order Onograceae (*Jussiaea grandiflora*), which grows there in luxuriant abundance. But far

more efficacious than all, owing to the rapidity of its growth, its wonderful powers as an absorbent, and the balsamic exhalation of its essential oil, is the Australian blue gum tree (*Eucalyptus globulus*). The genus eucalyptus contains over seventy species, of which six or eight have been introduced into California. Inferentially it may be said, that similar properties prevail among the species, though they may differ in their proportion of properties.

In a valuable paper read before the Medical Society of the State of California, Dr. W. P. Gibbons says: "It has not been proved, though asserted until belief is established, that the aroma of the eucalyptus is effective in preventing the incubation of intermittents. The exceedingly rapid growth of the tree is dependent upon the quantity of water which is accessible to its roots. The proverbially unhealthy atmosphere of swamp lands is due to stagnant water. Where currents are established by drainage or by excess of water, the cause of malarial fever if not entirely removed, is materially abated—it would be removed if the drainage were complete. Let us look at the results which naturally follow the planting and cultivation of some kinds of forest trees. In eight years the eucalyptus will attain a diameter of eighteen inches and a height of fifty feet. Experiments which I have made determine these facts: A branch of this tree which contains one hundred and five square inches of leaf surface, will absorb 3.25 ounces of water in eighteen hours. The entire tree will furnish an area of three hundred and ten thousand five hundred square inches of leaf surface, and the amount of water daily absorbed by the roots would equal six hundred and nine pounds or seventy-six gallons. Given a stagnant swamp of two hundred acres, each acre having two hundred trees, the amount of water daily absorbed by the roots would be three million and forty thousand gallons, or four hundred and five thousand three hundred and thirty-three cubic feet. This would be equal to a constant stream running at the rate of three miles per hour, two feet wide, six inches deep."

These results, wonderful as they may seem, are undoubtedly correct, and illustrate with vivid force the importance of planting this tree in malarial districts, not by setting out here and there a tree, but by planting them in forests, as has been done by Mr. Nadeau in the vicinity of Los Angeles, where the largest artificial forest in the State was planted by him. Mr. Nadeau, in December, 1875, sowed the seed of the eucalyptus in his nursery, and in six months thereafter transplanted the young plants in the location intended for their permanent occupation (eight feet apart), and now these trees have attained a growth of from seventy-five to one hundred and twenty-five feet in height, with an average diameter of twelve to fifteen inches. The extent of this grove is about one hundred acres, and for fuel, counting fifty cords to the acre, at \$5 per cord, would amount to \$250 to the acre. Its value for fuel and timber (at this time the trees being ten years old) is not less than \$20,000. Were this tree to be liberally planted in our marshes and swamps at intervals through the great valleys of the Sacramento and San Joaquin, there can be no doubt that the effects of malarial exhalations would be in a great measure neutralized. The Central Pacific Railroad Company has done much to bring this tree into notice by planting different varieties of it along the lines of their road, thus giving an opportunity to judge of the species best calculated to thrive in different soils and climates. Mr. J. Bosisto, President of the Pharmaceutical Society of Victoria, points out that the eucalyptus probably exerts its influence in this respect: "First, physically, by powerful root action in absorbing humidity from the earth; by its being evergreen, and in continued action; by the abundance of its leaf surface; by its evaporation of

water, oil, and acid under a perpetually genial atmosphere; and, second, chemically, by the power of its volatile oil and volatile acid, abundantly present in the plant and air to produce peroxide of hydrogen." According to Dr. Cosson: "Since the growth of plantations of this tree around the Lake of Fezzara, in Algeria, the malaria, which formerly was intense, has almost disappeared. The village of Ain Mokra, according to Captain Ney, furnishes an equally striking instance. The station was formerly so unhealthy that it was necessary to change the French garrison every five days on account of the number of men attacked. Fever has, however, become much more rare since plantations of eucalyptus trees have been made on the shores of the lake and the sides of the railway, which include altogether sixty thousand trees. A writer in the 'Paris Temps' mentions astill more singular effect, namely, that the parasites (phylloxeræ, etc.) disappear from vines growing near the eucalyptus. The experiment made during several years in several vineyards, has been uniform in its results. It is interesting, in connection with these facts, to observe that the leaves of this plant contain an ethereal oil, of which even half-dried leaves contain 6 per cent, and that this oil, according to Gimbert, is a very powerful antiseptic. The oil is officinal in the last edition of the United States Dispensatory. It will preserve blood and pus as long as carbolic acid (five months and more), and far longer than oil of turpentine. It prevents also the appearance of fungi or vibrios. These observations have received independent confirmation from Binz, in Germany."

With such evidence before us, we can scarcely question the fact that the eucalyptus exercises a potent influence in preventing the spread of malarial diseases, and if the attention of our people generally can be once drawn to the importance of its extensive cultivation, especially in districts where malarial diseases prevail, we may anticipate most important and beneficial results.

We might adduce many more evidences of the value of the eucalyptus, not only as a remedial agent, but for fuel timber, as a shade tree, as a protection to orchards and vineyards against the force of winds and the depredations of insect pests, and as a gatherer and dispenser of moisture; but we think enough has been said to convince the most skeptical of its value. When our agriculturists, horticulturists, and vine growers can be brought to understand that their best interests require them to study and practice collectively the all important triad—irrigation, drainage, and forestry—we shall no longer be called upon to write papers upon the subject of irrigation as an agent in the induction of malaria.

BACTERIOLOGICAL RESEARCHES ON YELLOW FEVER IN HAVANA.

By CHARLES FINDLAY, M.D., of Havana.

Every true lover of science must hail as a happy event for the furtherance of the bacteriological study of yellow fever, the visits made by Dr. G. M. Sternberg to Brazil, Mexico, and Cuba, for the purpose of determining whether the results of previous investigators, who claimed to have obtained characteristic colonies from yellow fever products, deserved to be considered as scientifically demonstrated.

Two courses were open to Dr. Sternberg for the fulfillment of his task: Either to verify the results by repeating the experiments according to the same methods employed by the original investigators, or to substitute a technique of his own, more in accordance with the improved systems of bacteriology, and to demonstrate the fallacies which the previous researches had been liable to. Dr. Sternberg has chosen the latter, perhaps the only one which his limited time would allow. By this plan, he has shown that the results announced were not obtainable by his own more accurate methods, and his judicious criticism has convinced us that our own *technique* had not been sufficiently precise to warrant definite inferences. Whatever disappointment this demonstration may have caused, has been, however, fully compensated by Dr. Sternberg's courtesy in making us acquainted with his own admirable methods of investigation, thus enabling us to test for ourselves our previous experiments.

In August, 1886, I undertook, in collaboration with my friend, Dr. Delgado, to inoculate blood and blister serum of yellow fever patients in sterilized agar-agar jelly, having failed to discover in those liquids any micro-organism directly recognizable under the microscope. For this purpose the finger of the patient was washed with soap and water and then with strong alcohol, after which it was pricked and the blood directly inoculated in the jelly by means of a sterilized platinum needle. The blister serum was obtained by means of a cantharidine solution in collodion, the skin having been previously washed with soap and water, alcohol, bichloride solution, and again with alcohol. After twenty-four hours the needle was introduced into the unbroken blister and directly inoculated into agar-agar jelly. By this means we obtained in a fair proportion of cases yellowish-white colonies at the point of inoculation and along the track of the needle, sometimes combined with another orange-yellow colony. Under the microscope we found the colonies to be composed of micrococci, variously grouped. Inoculations in dogs, rabbits, and guinea pigs gave no evidence of pathogenic properties; but similar white colonies were obtained on the fourth and fifth day from blood and blister serum of the inoculated animals, and, strange to say, the same white colony resulted, whether the animal had been inoculated with the white or with the orange-yellow colony.

After continuing our successful experiments until October of that year, we failed in all our attempts during the succeeding months until the following June. We had noticed, moreover, that the results were always negative when we attempted the same cultures from patients presenting

suppression of urine, or symptoms of uræmia. The same restrictions and interruptions were likewise observed by us the following year.

In June, 1887, we again obtained our white and orange-yellow colonies, and, moreover, ascertained that the white was characterized by the tendency of the micrococci to form tetrads, either simple or compound, and which often carried irregular chains of three or four elements appended to one or more of their angles. Inoculations upon rabbits and guinea pigs again gave negative results. We were able to verify the presence of tetragenous in some twenty cases of yellow fever, between the months of June and November of that year, and on revising our cultures of the previous one the tetrads were also found, as also in two cultures from the kidney and liver of an autopsy made in 1886.

Some control-experiments upon healthy, non-acclimated subjects gave negative results, with one exception, which afterwards proved to have been in the period of incubation of a severe attack of yellow fever, which manifested itself eight or ten days later.

We sent specimens of our cultures to Prof. Welch, of the Johns Hopkins University, and to Dr. G. M. Sternberg, who both verified the presence of tetragenous in our cultures, though apparently of different varieties and mixed in most cases with bacilli, some of which liquefied gelatine. In the meantime Dr. Matienso, of Vera Cruz, had likewise obtained cultures from yellow fever products, and in one instance observed a tetragenus.

Dr. Gibier, on examining our cultures, did not admit that they were typical tetragenous, but averred that they were morphologically identical with Dr. Freire's. There is, however, this difference, that Dr. Freire's cultures liquefy gelatine, whereas my own, in pure cultures, do not.

Dr. Sternberg failed at Rio Janeiro to obtain any cultures from specimens of blood collected by himself from yellow fever patients; but from samples which had been collected for him, and according to his own method, by Dr. Arango Goes, he obtained a yellow colony consisting of a large micrococcosm in tetrads, like some which he subsequently found in my own cultures.

Finally, Dr. Sternberg made a number of experiments and surface cultures in Rio, Vera Cruz, and Havana, by which he satisfied himself that yellow fever patients, as also some of the other inhabitants of yellow fever countries, habitually present upon the surface of their skin micrococci in tetrads.

These coincidences appeared somewhat remarkable. On the other hand, having practiced since 1881 several successful inoculations by means of contaminated mosquitoes, as described in the "American Journal of Medical Sciences" (October, 1886) and elsewhere, we ascertained that mosquitoes which had been made to sting yellow fever patients, and afterwards were inclosed in phials containing sterilized agar-agar jelly, developed colonies of tetrads like those which we had obtained from yellow fever products.

In spite of these results, Dr. Sternberg's objections to our methods of investigation, coupled with his assurance that no evidence of tetragenous germs had ever been found either in the blood or tissues of yellow fever subjects, examined according to approved methods, induced us to accept as a plausible explanation, that our cultures might have proceeded from surface germs; provided, of course, that the experiments which Dr. Sternberg was about to undertake should confirm his previous experience.

During his stay in Havana Dr. Sternberg limited his researches to cadaveric products. He performed, as stated in his communication to the Havana Academy of Medical Sciences, ten autopsies upon yellow fever

subjects, within from two to five hours of their death, and with the following general results:

Heart Blood.—In two cases colonies of bacillus (*a*) were obtained, in the other eight the results were negative.

Urine, collected in the bladder. Three cases gave colonies of different bacilli, and seven proved sterile.

Kidney.—In six cases micro-organisms were developed, four remaining sterile.

Liver.—Three cases gave colonies of bacilli, and seven were sterile.

Contents of Stomach and Intestines.—In eight of the ten cases bacillus (*a*) was found present.

Finally, in three cases, pieces of liver and of kidney were soaked in bichloride solution (1 per cent), then kept forty-eight hours wrapped in muslin or tissue paper saturated with the same solution. At the end of that time cultures were made from the interior, where the bichloride had not reached. In one of the three cases both the liver and the kidney gave colonies of large micrococci in tetrads like my own, besides others in short chains and a liquifying staphylococcus. An Esmarch tube, prepared by Dr. Sternberg from these micrococci, and which he kindly left with me, presented very characteristic isolated colonies, from a single one of which I obtained a small bacillus growing into a spirillum, and also micrococci in tetrads and in short chains.

This last result of Dr. Sternberg's researches certainly shows that tetragonous germs do find their way into the tissues of yellow fever patients, and it is quite possible that they may have existed in other cases likewise, and that the failure of bringing them into existence may be due to our ignorance of the measures best calculated to do so.

It behooved us, therefore, to resume our former experiments upon the blood and blister serum, with such modifications as might exclude the sources of error to which our attention had been called. We therefore adopted the following plan for collecting our material:

Finger Blood.—1. The finger having been carefully washed with soap and water and with absolute alcohol, by means of sterilized rags or cotton, a *surface culture* is made according to Dr. Sternberg's method (a couple of drops of sterilized bouillon are expelled from one of his bulbs, and after rubbing the skin with the capillary joint, the expelled portion is allowed to reënter, the bulb, and the latter is again sealed).

2. The finger having been pricked with a sterilized needle, at the spot where the surface culture has just been made, the blood is collected in dry bulbs. The blood is also directly inoculated into solid agar-agar jelly.

3. The same finger is then washed with alcohol, then with bichloride of mercury (1 per cent solution), and finally with absolute alcohol, and a second surface culture is taken.

4. The spot from which this second surface culture has been taken, is again pricked and the blood collected in sterilized bulbs, or inoculated directly into solid agar jelly.

For Collecting Blister Serum.—The following articles are prepared beforehand and kept in bichloride solution (1 per cent) until required for use: Two rubber rings of four and six centimetres, respectively, inner diameter; a square piece of oiled silk; a square piece of muslin. The patient's arm having been carefully washed with soap and water, bichloride (1 per cent solution), and again with absolute alcohol, four small dots are marked on the skin to limit the space where the blister is to be applied. Four layers of cantharidine collodion are then applied; the smaller rubber ring is placed around the blister; the oiled silk over the ring; the larger ring

over the silk, and the muslin compress over the whole. A broad band of adhesive plaster fastens the dressing upon the arm, and a wire shield protects the blister. After twenty-four hours the dressing is removed and the serum collected from the *unbroken* pouch in sterilized bulbs, or used to inoculate solid agar jelly.

This technique was strictly adhered to in the case of a soldier in the fourth day of fatal yellow fever, occupying bed No. 46, fifth ward, of the Military Hospital, in Dr. Rivas' charge, on the twenty-seventh and twenty-eighth of June. The results were as follows:

1. *Surface Cultures*.—Both the cultures prepared *before* and *after* the skin had been washed with bichloride remained sterile, showing, after the lapse of thirteen days, absence of surface germs at the spot where the blood was collected.

2. *The Blood before the Application of the Bichloride*.—(a) Of two solid agar tubes inoculated directly from the finger blood, one gave a white, creamy colony on the fifth day, consisting of a micro-organism in tetrads and short chains, the other remaining sterile. (b) The blood collected in sterilized bulbs was used the following day to prepare a gelatine Esmarch tube, which was thought to have remained sterile, but a cloudiness was observed, composed of innumerable dots (colonies?), from which a new tube has been inoculated.

3. *Blood after the Application of Bichloride*.—(a) Two tubes of solid agar jelly inoculated directly from the finger blood have remained sterile. (b) The gelatine Esmarch tube, prepared with two or three drops of blood collected in a sterilized bulb, produced a number of isolated colonies, some of which were inoculated in agar; but later on, the gelatine having melted with the heat, a sediment, partly white, partly yellow, settled at the bottom, and new cultures were obtained from the latter.

4. *Blister Serum*.—(a) The two tubes of solid agar, directly inoculated from the blister serum, remained sterile. (b) A gelatine Esmarch tube prepared with two drops of pure serum, five hours after collection, produced a number of isolated colonies, mostly of a yellowish brown, with smooth edges, but a few were somewhat lobate. After awhile a whitish semi-fluid film formed over the gelatine. Separate cultures were made from this film. Finally the gelatine was liquified.

With the exception of the direct culture in agar jelly from blood *before* the application of bichloride, and which gave only a micrococcus in tetrads and in short chains, like those obtained by us last year, the other cultures from the blood *after* the bichloride application, and from pure blister serum, gave micro-organisms of two, or possibly three, different kinds.

1. Micrococci in tetrads, intermixed with some in short chains, similar to those obtained by us in 1887.

2. A small bacillus, not unlike Dr. Sternberg's bacillus (a) when single, but generally occurring in short chains, agreeing in every respect with the description of Babé's *chainettes*. The specimens derived from the blood culture are somewhat more slender than those from the blister serum, and resemble more closely the chains contained in the kidney section prepared by Dr. Sternberg from specimens in Dr. Lacerda's collection, and which he was kind enough to give me. In drop cultures the short bacillus is seen to be knobbed, and is quite mobile. The short chains are also knobbed, and the larger ones present several articulations or joints which are quite independent of the knobs; the latter corresponding to the stained portions of the dry specimens. In some of the filaments false branches appear, both in the moist and dry preparations, suggesting the idea of a clodothorix.

3. A preparation from the semifluid film, which formed over the surface of the gelatine Esmarch tube, prepared from pure blister serum, showed typical tetrads like those observed in the blood, and also Babés' *chainettes* and branched filaments (clodothorix?). Most of the filaments or *chainettes* were found to carry along their sides or at their extremities colored grains (spores?) variously grouped, some in regular tetrads, and which could not be morphologically distinguished from the other cocci in tetrads, seen in the same preparation.

A rabbit received by an intra-peritoneal injection three centimeters of a bouillon culture of the bacilli, which I call "*Babés' chainettes*," without any pathogenic manifestation.

The above results are given merely to show that our tetragenin in this instance could not be attributed to surface germs, and that it is yet possible that one or several of the micro-organisms pointed out by previous observers and by Dr. Sternberg himself, may be found to play an important part in the etiology of the disease.

Since writing the above, Dr. Delgads and myself performed, on the thirty-first of July, an autopsy, three hours after death, on a subject who had died in the third day of yellow fever at our Military Hospital. The juices from the liver, kidney, and spleen were collected in Sternberg bouillon bulbs, with the necessary precautions, cultivated in semi-fluid gelatine at 30 degrees to 32 degrees C., and from the whitish sediment that formed after forty-eight hours, agar Esmarch tubes were prepared. Round, pale, straw-colored colonies, with smooth edge, were obtained from the three organs; they consisted of our micrococcus in tetrads and short chains.

Pieces of liver, kidney, and spleen were soaked in (1 per cent) bichloride and wrapped in cloths steeped in the same solution. After forty-eight hours cultures were prepared from the kidney and spleen, and also direct stick cultures made in solid agar jelly. The piece of liver was beginning to decompose and was, for that reason, discarded. From the kidney, both the direct inoculation and the Esmarch tubes gave our micrococcus in tetrads and short chains. The direct inoculation from the spleen also produced the same microbe, but the germs failed to develop in the Esmarch tubes, the bichloride, perhaps, diffused too freely in the substance of the organ, thereby impairing the vitality of the micro-organism.

The colonies from stick culture in solid agar are at first white with a slight yellow tinge, but as they grow older the yellow color becomes more distinct, though varying in intensity in different samples even from the same source.

Not having found, in this instance, any trace of the bacillus in short chains, resembling Babés', described above, we infer that their presence in the former case may have been due to a "mixed infection" which, we believe, generally occurs in *melanic* cases.

Inoculations in rabbits and guinea pigs with pure cultures of our microbe have hitherto given negative results. We have also tried them upon ourselves and upon two non-acclimated subjects in Havana. In Spain, Dr. Ferran, of Barcelona, to whom we had sent samples of our old (last year's) cultures, tried upon himself and upon his assistants subcutaneous injections, and swallowed liquid cultures from our own. The results have so far been negative. We purpose, however, resuming our experiments with our fresh material, for it is possible that, notwithstanding their inefficiency to produce immediate pathological manifestations, such inoculations might confer immunity.

So far we have only succeeded in reproducing the disease by the somewhat

irksome process of our "mosquito inoculation," as described in the "American Journal of Medical Science" (October, 1886). During the present year we have only applied the process to one person, employing two infected mosquitoes. A mild attack of non-albuminuric yellow fever resulted after twenty-one days' incubation. None of the persons so inoculated, in the course of the last seven years, have been subsequently attacked with yellow fever after the first mild manifestations which followed the application of the mosquitoes in about one fourth of the cases. Of the others, which had shown no immediate effects, some have subsequently had a mild attack, but no fatal case, and only two albuminuric have been recorded among the thirty subjects or more in whom the applications had been made during the summer months, and according to the conditions which we have repeatedly indicated (absence of uræmic or typhoid symptoms, and limits between the third and sixth days of the disease in the patient from whom the insects are contaminated).

Believing as we do that mosquitoes are the habitual agents of transmission of yellow fever, we recommend that patients attacked with the disease should be protected, as far as possible, against the bites of those insects, in order to check its propagation to others. Perhaps some local application, such as quinine in alcohol, to the uncovered parts of the body might be useful for that purpose.

CUBA IN ITS RELATION TO THE SOUTHERN UNITED STATES; ITS DANGER AS A DISEASE-PRODUCING AND DISTRIBUT- ING CENTER.

By WOLFRED NELSON, C.M., M.D., member of the College of Physicians and Surgeons, Province of Quebec, Canada; late Board of Health, State of Panama, South America; correspondent State Board of Health, California, etc.

Ere considering the City of Havana and its surroundings, climate, and past history, I shall commence by describing the Military and Naval Hospital there. It lies within the city proper, and is an immense building, built of stone, originally intended by the Spanish Government for tobacco warehouses, at the time when the Government controlled that vast business. Later, when the control ceased, the Government had the building fitted for a huge military and naval hospital.

It is two stories high. Perhaps the better way to convey an idea of its vastness will be by stating that, mainly on the upper floor, are sixteen hundred beds. There are military and naval wards, wards for the insane, smallpox, etc. The military and naval wards are subdivided into medical and surgical sections, and have their own staffs.

The wards are very large, being the full breadth of the building. They are called *salas*, or halls. Roughly, they are one hundred feet long by, say, forty feet wide, with windows on either side, with terminal rooms for the pharmacies, doctors, nurses, etc. They are well ventilated and get no end of air—such as it is—and no end of sunlight. The beds are arranged in long rows down the sides of the wards, the patients looking towards each other; thus there is a large central aisle.

With Dr. Daniel M. Burgess, formerly of the United States army and now a practitioner in the City of Havana, I visited the buildings, and, thanks to the courtesy of Dr. Fernandez, of the Spanish army, every facility was granted us for seeing things just as they were.

In a large ward containing, say, seventy patients, we saw and carefully examined seven cases of yellow fever, noting the various conditions of the patients—such as black vomit in one case, urine in another, later noticing its testing—the examination of the very full and careful clinical notes of the cases, etc. I was most careful in my mental note taking, contrasting what I saw with my five years' experience on the Isthmus of Panama, and from having seen the disease on the West Coast of Mexico in the summer of 1885, when I traced the history of the Mexican epidemic, which was published *in extenso* in the last biennial report of the Board of Health of the State of California. I may add *inter alia* that ere "doing" the Military and Naval Hospital in the City of Havana, I had spent upwards of five months in the oldest city in the Island of Cuba, to wit, Santiago de Cuba, and, thanks to the courtesy of my friends Drs. Hartman, Urbano Guimera, Ros, and Castillo, I had opportunities for studying the disease in the Eastern Department of Cuba.

In military wards yellow fever patients are placed side by side with those suffering from any illness, no distinction being made. While this may surprise those who have not had long and close relations with yellow fever, it does not surprise me in the least. "Why," say you? Failing epidemic

conditions, there is practically no danger. I speak from knowledge. Again, failing the usual conditions noted in seasons of epidemic in Cuba, such as an irregular season, great heat, want of rain, etc., with a very high temperature—failing these, no new cases would develop, or so few as simply to prove the exception to the rule in Havana.

Referring to Isthmian experience, I may state that the Lady Superior of the Military and Charity Hospital in the City of Panama never knew a case of yellow fever to develop in a huge ward under her charge, a ward having one hundred and fifty beds. I simply cite this Isthmian experience to emphasize the above statement. In speaking so positively of the disease, I fall back on a close study of eight years of yellow jack and his kindred, and from having compared notes with profound students of yellow fever in the West Indies, Mexico, Central America, and the northern end of South America, private practitioners in dozens of localities, and naval and military surgeons wherever I could meet them. As you will gather by what is to follow, that vast system of hospitals in Havana, while being thoroughly infected with yellow fever, it is an exceptional thing for a case to develop in wards, outside of the epidemic conditions previously alluded to, and despite the fact that the air that enters the building is foul-smelling, being the fecal atmosphere noticed in all Spanish West Indian cities.

After carefully examining two of the long wards, and noting the corridors, the general cleanliness, and order, we descended the broad stone staircase to the main or ground floor of the huge quadrangle, and walked along the cloister-like passages, noting the huge storerooms on our right filled with medical and surgical supplies, etc. Here are vast quantities of stores, as this building issues them to all the hospitals, military and naval, in the Island of Cuba.

Now, then, pray remember the constant presence of yellow fever in that building; sailors from the vessels of war; newly arrived recruits from Spain; also remember the direct and wholly unrestricted communication between all parts of the building, etc.; patients, doctors, nurses, and orderlies moving about as freely as if no disease was present—in short, with absolute freedom, and, I may add, with the most perfect nonchalance. Nothing is thought of the danger—nothing. It is just as much a product of the Queen of the Antilles as her tobacco; it is so common, and such an every day affair, that it is a constant source of joking in all the theaters of Havana—a ghastly yellow joke. As a close student of yellow fever, and having seen the disease in various places, I was not surprised, knowing the indifference with which Spaniards and Cubans alike look on the disease.

If the danger of infection was confined to the building in itself my surprise would have ended there and then; but when I stop to reflect that the storerooms beneath the wards were filled with all sorts of stores, including hospital bedding, etc., it gave me food for thought. There can be no question in the mind of any student of yellow fever as to that vast hospital as a constant recipient and distributor of yellow fever. To repeat, despite the fact that the building is infected, and so to speak saturated, with the poison of yellow fever, it is an exceptional thing for a case to develop in the wards. During epidemic seasons it goes without saying that the disease has developed in the wards—the same as it does in all countries when the necessary epidemic conditions obtain. There can be, and is, no doubt in my mind that the hospital bedding, shipped about the island to other hospitals by the ordinary steamers, and by the various vessels of war, is infected; and such material or fomites, time and again, has established new foci of disease.

I can recall a limited epidemic in the fort at Caiminero, or the Port of Guantanamo. The disease broke out among a lot of new recruits, killed twenty-one of them, exhausted itself, and became quiescent. This was in the fall of 1886.

Probably but few of my readers are aware of the fact that Cuba, or the Queen of the Antilles, is almost a small island continent. Its length is seven hundred and twenty-one miles, or the counterpart of that of the coast line of California, the second largest State in the American Union. All the cities of Cuba, inland as well as on the coast, are garrison towns and ports. In the cities and towns Spanish troops will be found, and in all ports Spanish men-of-war of various classes. The main hospital in the City of Havana, in constantly supplying one and the other with stores, unquestionably is constantly creating new foci of disease. This statement I deem absolutely indisputable. Strange as it may seem, the Spanish Government does nothing, and the matter goes on as it has done during long decades, and as it will do to the end of all time (I mean Spanish time). Hence, yellow fever obtains in all the military and naval hospitals of the island, and nearly at all seasons of the year.

It is never absent in the City of Havana, there being a few cases even in the coolest weather, or when American winter visitors flock to that charming city to get an insight into things Spanish. While the City of Havana during that season is comparatively free from yellow fever, the City of Santiago de Cuba, at the opposite or eastern end of the island, always suffers most.

According to Dr. John Guiteras, of the United States Marine Hospital Service, a profound student and writer upon yellow fever, the City of Havana has had an annual epidemic for over one hundred years. July, August, and September are the fatal months of the year, and the Cubans, in their late insurrection against Spain, called those months their "Three Generals," as they had rendered them their greatest aid during the late insurrection, which lasted from 1868 to 1878, they meaning that yellow fever had swept their enemies away like chaff before the wind. During that insurrection two hundred thousand Spaniards lost their lives in the Island of Cuba, the vast bulk of them from yellow fever.

ACCLIMATION.

A word regarding an old time myth. It has been the custom of people to talk about the protecting influence of acclimation. There is no acclimation that protects against yellow fever—none. The only protection against the disease is to have experienced it. No modern student of yellow fever with whom I have the pleasure of being acquainted, whose opinion is worth citing, places one tittle of reliance in acclimation; and if that old theory needed a *coup de grace*, it has received it within the last three months in the epidemic of yellow fever that has swept the City of Sancti Espiritu in the Island of Cuba. "El Pais," a newspaper of that city, recently published the death rate, and, among other facts, stated that twenty-four children, all native born, had been swept away in a single day by *el mal del pais*, as they call yellow fever.

Now then, I ask a question: If there is anything in acclimation, why didn't it protect those native born children? And, I answer it in person, by stating, because there is nothing in acclimation.

We, as students of disease, must bear in mind that between epidemics numberless children are born, and when a new epidemic approaches they become food for it. While it is quite true that the mortality among native

born children and natives is somewhat less than among foreigners, still the disease sweeps them away. And, as a collateral statement to this one, I will cite the experience of my friend, Dr. Didier, formerly a practitioner at Guadaloupe, one of the French West Indian Islands, who for a time was one of the physicians to the Panama Canal Company, while my brother, the late Dr. George W. Nelson, was Resident Physician at the Canal Hospital in Panama. He informed me, that in off seasons, or when there was no epidemic in that pretty island, the children of creoles showed no symptoms of yellow fever, but when the necessary atmospheric conditions came about (that are so intimately associated with these epidemics and yet are so exceedingly difficult to describe) such children came down with yellow fever, and while the mortality among them was less, still many died. Having disposed of that old time myth, let us return to

THE CITY OF HAVANA.

The City of Havana and the Island of Cuba generally, is a constant producer and distributor of yellow fever, and by her geographical position and nearness (ninety-four miles to Key West, Florida), and with almost daily steam communication, she is a constant source of danger to all ports trading with her, particularly to all ports having almost identical climatic and geographical conditions. I refer particularly to Florida, Louisiana, and Alabama, bearing in mind their heat, their moisture, swamps, etc. Just so long as Spain neglects her duty, just so long will Cuba be a constant source of danger to all doing business with her; and, as seven eighths of all her exports come into the United States of America, the danger to the said States is greater than for countries receiving her goods after many days' travel. And even they are exposed. A limited epidemic of yellow fever in England in the fall of last year, was traced to a brig—copper-laden, from Santa Iago de Cuba—as may be gathered from my article in the last report of the State Board of Health, State of California, 1886. The constant source of peril is to the ports of the Southern United States. In May last, I left the City of Havana for New York. Upon getting upon the steamer "Hutchinson," of the Morgan Steamship Company, I noted among the steerage passengers a lot of filthy humanity—Turks. I also noted the careful way in which they were inspected, individual by individual, by Dr. Daniel M. Burgess, the Inspector of the United States Marine Hospital Service in Havana. These Turks were wholly unacclimated; that is, they had not had yellow fever. They had been spending some six weeks in the City of Havana, peddling and living in the slums of the city. As stated, I was present at the examination of these people, and they left the City of Havana in excellent physical condition, as far as the eye could judge. We sailed from Havana on the seventh of May, and as the quarantine season at Tampa, Florida, was not in force, the company could not refuse the sale of tickets. At that very time there was much yellow fever in the lower part of the city. On our way to Florida, I kept my eyes on these people, fearing that yellow fever would develop and that we should be detained on making the mouth of the Mississippi. They were an exceedingly filthy mass of humanity—men, women, and children—clad in rags.

On reaching Key West I saw my friend Dr. J. Y. Porter, the able President of its Board of Health, who came down to the steamer, and I directed his attention to them as a source of danger to any port at which they might land. As they were going beyond Key West, of course he had nothing to do with them. No passengers were allowed to debark there.

I stepped off on to the pier and was ordered back on the steamer. This was absolutely correct, and in strict keeping with what we know of keeping out yellow fever. Still, I noted the landing of many baskets of fruit covered with coarse matting that had been shipped from the lower part of the City of Havana, from spots noted for their foul odors and disease.

Among my fellow passengers it was my good fortune to meet Dr. J. W. Ekens, a retired practitioner, from Yorkshire, England. While he had had no experience with yellow fever, he had had a most extensive experience as a Health Officer in Yorkshire, and he fully agreed with me as to the danger lurking in such forms, that is, unless scientifically disinfected, *a la* Holt.

At Tampa, Florida, I sent a line to my friend Dr. John Wall, a profound student of yellow fever, and the President of the Board of Health there. At Tampa, Florida, the Turks went off in a small tender. Subsequently, I learned that Dr. Wall did not receive my letter until another steamer came in three days later, from Havana, when it and a letter from Dr. Burgess reached him together. Dr. Burgess wrote that he had learned that one of that same band of Turks had died of yellow fever in Havana early in May. Had my letter reached Dr. Wall in time he would have been powerless, as the quarantine was not in force. Immediately upon receipt of our letters he had the people hunted for, but they had gone to various localities. Upon getting to New Orleans I read my pencil notes to my friend Dr. Joseph Holt, whose Ideal Quarantine at the mouth of the Mississippi is the admiration of all writers and students of sanitary science. Dr. Holt took instant action, and notified the Government of Florida, and the Turks were hustled out of that State, *but not before one of them had died of specific yellow fever in Plant City, about the end of May or beginning of June.* This I subsequently learned in November, 1887, from my friend, the able President of the Jacksonville Board of Health, Dr. Neal Mitchell. I was then en route to Tampa, to see the yellow fever in that city. Hence my warning had not been in vain regarding those Turks. The Tampa epidemic I shall refer to later on. I simply refer to those Turks collectively, as an illustration of the dangers of rapid transit—rapid transit to benefit a steamship line and a few railroad magnates, a transit that has done the State of Florida more or less of damage by the yellow fever now raging there. After visiting Tampa last fall, and finding that my friends Dr. John Wall and Dr. J. Y. Porter were unjustly opposed by conscienceless individuals, I sent the Jacksonville "Times-Union" a letter, calling the disease yellow fever, properly so called, and warned the State *that this year it would be upon them.* (See "Times-Union" of November 30, 1887.) This rapid transit means that thirty hours after leaving the City of Havana one is in the City of Tampa, and ten hours after leaving Havana one is in Key West, an island of the Florida group.

Perhaps it will throw some light on this matter, if I state that I have seen a good deal of the Southern States. I refer to Florida, Louisiana, Alabama, etc. My trips to the South have been six in number, including two months spent in Louisiana, Florida, and Alabama, where I made my own observations and exchanged views with many veterans who have faced yellow jack in the field. During my visits to the Sunny South I added to my small knowledge of yellow fever by culling all that I could from many confreres with whom I was brought in contact. I also noted the geographical features, particularly of Florida, Louisiana, and Alabama, and saw all that was necessary to explain to my mind why yellow fever has so swept them in times past. As already stated, I noted very particularly the swamps, heat, excessive moisture; in short, each and all of the condi-

tions that extended a constant and generous welcome to yellow fever germs. I say germs.

Again let us return to the Military and Naval Hospital. Leaving the storerooms, a polite orderly took us along the cloister or corridors made by the Moorish arches and stone floors, across the central court, or *patio*, of the huge building, past trees and luxuriant vegetation, and a wealth of flowers, the whole making a most effective contrast against the white-washed walls of the building. On we went, past all this pleasantness, finally passing below a stone arch, past the wards for the insane, and into an open space back of the main building. I mean the sea face of the huge quadrangle, and we stood facing an upper arm or horn of the Bay of Havana. The rear walls of the building are within say one hundred feet of the seawall. To the right we passed the dead-house. We were told that often there were seven or eight corpses in it at one time. It is within a few feet of a very narrow and dirty lane, on which faces a vast warehouse for sugar, of course, for export. The great bulk of the sugar goes to the United States of America. In connection with sugar let me say to the students of yellow fever that the favorite method of shipping sugar is in sacks. Could better fomites be found.

Passing from sweet to other themes, we will now consider the hospital closets. They project in part over the water; they are quite as foul smelling as one would expect under a tropical sky. The seawall is of a soft coralline stone, so soft that the masons may be seen shaping it with their broadaxes. The rise and fall of the tide is practically *nil*. It is hardly necessary for me to dwell on what may be expected from soft porous stone, almost spongy in texture, constantly surcharged with fecal matter from the huge hospitals now under consideration. The water there is very shallow, in some places but a few inches deep. Need I describe it to you? Within one hundred and fifty feet of the closets, the *light draft American schooners* discharge and receive cargo, anchored for days together in the foul waters of that part of the harbor, waters that practically are never changed.

Having carefully noted each and all of the conditions, the position of the shipping, and the hospitals and buildings, we again retraced our steps, passing cloister after cloister, past several wards filled and partly filled with patients, and reached the main entrance, where we said *adios*, or farewell, to the military orderly who had shown us over the building and premises. We then passed along the main front of the building, and turned down the narrow, dirty street to our left, following the hospital walls on past the dead-house and closets already described, and stood on the wooden pier, looking directly back on the spots just referred to.

At the end of the pier was the American brig "*Hyperion*," of Philadelphia, discharging coke, certainly not two hundred feet from the closets. Dr. Burgess pointed out another pile of coke just discharged by another vessel, that having laid alongside the pier instead of at its end, like the "*Hyperion*," had been bow on to the closets, and within one hundred and fifty feet of them. Remember the vessels and their vicinity to hospitals, etc. Frequent cases of yellow fever appear in these vessels, and they return with cargoes of sugar to American ports, the whole constituting a constant source of danger, particularly to the Southern United States.

The hospitals lie at the upper end of this arm or horn of the bay. There are many slaughter houses there whose blood, refuse, etc., is added to the perpetual nastiness thereaway. Dr. Burgess informed me that at times enough blood ran into the horn to color the waters a bright scarlet. A small river, so called—a mere rivulet—empties into the horn, but its

waters, except during the wet or rainy seasons, are so scanty as to be of no value for flushing purposes. We must bear in mind that the rise and fall of the tide there is very small, being identical with that of another pestilential and death-dealing center. I refer to Colon, the Atlantic city of the Isthmus of Panama, a city whose conditions I described at length in the last biennial report of the Board of Health of the State of California. (Refer to my article on "Yellow Fever in its Relation to the State of California.")

The piers along that waterfront are wooden. Where seawalls exist, they are of the soft, porous coralline stone already described, the whole eminently fitted to entangle, retain, and foster low forms of vegetable life and the germs of disease. I say germs of disease.

We walked along past huge sugar warehouses, Spanish gunboats, and shipping of all nations, towards the city. If the waters are foul at the upper horn, where the warehouses are, you can fancy what they are just near the narrow entrance to the harbor, where drains pour in their reeking contents directly amid and under the very bows of the ships as they lie stem on at the piers. They lie stem on for want of room. A large fish market contributes its due share of filth. Literally, "it smells unto Heaven."

The City of Havana has a population estimated at two hundred and four thousand. It is but partly drained. Old-time privies and cesspools poison the air and soak the earth with fecal poisons. Its whole subsoil is contaminated. When in Havana, in November of the year previous, I purposely visited the docks near La Machina, in the vicinity of the Custom House, where the entrance to the harbor is narrow, and where the vessels for want of space lie side by side, as already stated. There I noticed that in the dirty waters occasional bubbles arose to the surface to discharge their foul gasses, telling of fermentation far below. In the very thick of this sewage the vessels and the sailing ships are found. In them yellow fever makes constant ravages at all seasons of the year, particularly in the hot months. We owe much to commerce and rapid transit. We are also indebted to it for epidemics of yellow fever. With proper sanitary precautions the Southern United States would be free from all future epidemics of yellow jack. But will they be? I doubt it. Why? Because "corporations have no souls to damn and no backs to kick," and because mankind is selfish and grasping in the search for riches.

The entrance to the harbor of Havana requires special mention. To place this word-sketch before you clearly, let me give full details. The entrance to the harbor may be six hundred feet across. The harbor may be described as a small inland salt lake, perhaps a mile and a half or two miles long, by three fourths of a mile across in its broadest part. The entrance to the harbor is guarded by the old-time historic fortifications called El Morro. Just opposite, or across the entrance, are other fortifications, covered with huge siege guns, on the city side. Remember, the narrow, gatelike entrance, a mere water lane, and beyond the harbor, receiving all the filth and sewage mentioned. As one would expect, who has traveled in the West Indies, Mexico, Central and South America, and Havana, owing to the old-time closets, want of drainage, subsoil contaminations, etc., the city is a disease-producing and distributing center; the air in certain sections reeks with the vile fecal odor so familiar to all travelers in Spanish-American cities within the tropics. Huge street gratings ventilate the few drains, and the reeking odors almost stifle one in the crowded centers. These drains are never flushed except by the heavy rains, and if flushed would only empty their fermenting contents into the bay below.

A mere reference to fœcal fermentation within the tropics, to all students of disease is ample, without entering into specific details. I may add *inter alia* that there are some students of yellow fever who believe—and undoubtedly their belief is a just one—that the fœcal matter from all such yellow fever patients is as essentially dangerous as are the stools from typhoid patients.

The point I wish to make, and impress upon my readers, is this: That the poison of yellow fever is just as much a part and parcel of the City of Havana, as the houses and churches of New York are a part of that noble city. I make bold to state that the yellow fever poison is as much an article of export from that island as are its famous cigars. While the harbor is foul and dangerous, the city is the habitat of yellow jack.

So much for my reflections, hurriedly jotted down in pencil, on the steamer "Hutchinson," amid passengers and squalling children, and now rapidly dictated to a stenographer.

There is one fact to be borne in mind in connection with this subject of yellow fever, and it is this: the constant war by steamship agents and railroad men against all medical men who have the courage of their opinions, and dare to tell the truth. Alas, they duly recognize the value of Sidney Smith's old trueism, "Corporations have no souls to damn, and no backs to kick;" and while they are endeavoring, as they are in duty bound to do, to warn their fellowmen, to protect themselves against this dread disease, steamship agents, officers, etc., are bulldozing Consuls and doctors to obtain clean bills of health. *They lie fluently and ably, because they are paid to do so.* But when, through their criminal action, disease has been grafted on a port, they flee, and medical men are left to face the danger.

In concluding this somewhat lengthy article, it does seem to me, as a student of this awful disease, that if people wish to suicide, they should have their own way; but that they should be allowed to sell their products, and ship their disease to other countries, is manifestly a gross injustice to their fellowmen, *and an insult to sanitary science.*

A time may be coming when international law will grasp this huge problem, and say to calloused countries like Spain: "If you are willing to have your subjects swept away by yellow fever, as a direct result of your gross and criminal carelessness, well and good; but you shall not trade with me, and expose me and mine to epidemics of yellow fever, as you are doing, as you have done, and as you will do, to the end of all time, if left to your own devices."

THE PRESENT TENDENCY TO EPIDEMICS.

By WOLFRED NELSON, C.M., M.D., member of the College of Physicians and Surgeons, Province of Quebec, Canada; late of State Board of Health, Panama, South America; Correspondent State Board of Health, California, etc.

In August, 1886, while in the City of Mobile, Alabama, I wrote thus: "What significance has the present tendency of disease to take on epidemic character?"* That question was asked at the time, when a vessel from Colon had made the mouth of the Mississippi with yellow fever on board. She was ordered to Ship Island.

I also wrote: "The value of quarantine is fitly illustrated by the following from the 'Telegram,' of Mobile, of date August 21, 1886: 'During the present month some six or eight ships have arrived at Ship Island quarantine station, which either contained members of the crew sick with yellow fever or had lost men on the passage from Colon by that disease. By carefully isolating the quarantine station from the mainland, and keeping all communications closed, the physician in charge has prevented any spread of the disease. These cases were undoubtedly yellow fever of a virulent type—the type of the Isthmus of Panama—and the confinement of the disease to the station is one more evidence of the benefits of a strict quarantine, remote from crowded communities. Had these ships been allowed to come up the Mississippi to New Orleans, there is every reason to believe that ere this, with so many cases of possible sources of contagion, an epidemic would have developed. As it is, New Orleans and the entire coast is enjoying excellent health, and the yellow fever at quarantine is disappearing gradually with the convalescence of the patients.'"+

Again, to quote from the same source, page 239, apropos of the above: "Acting Surgeon-General Stone, of the Marine Hospital, Washington, in his recent report of the nineteenth of August, referred to the vessels now in quarantine, and said there was no danger of the disease spreading." *And there is none if the isolation is real and absolute.*

The words in italics are my own, and will be found in the paragraph quoted from that report. Now, then, what resulted? To condense an immense amount of published matter, I may state that the isolation was not *real*; neither was the quarantine *absolute*. Boats did pass between the shore and the vessels, and the result was an outbreak of yellow fever in the town of Biloxi, Mississippi. Biloxi is one of the coast towns. I was in the State of Louisiana at the time, and was present at several meetings of the Board of Health, called in the City of New Orleans to consider that very outbreak. That it was yellow fever was most emphatically denied by doctors of great and no repute at all. Still the people sickened and died, and but for the energetic and most effective measures instituted by the Board of Health of the State of Louisiana, the disease would not have been encircled and stamped out as it was. Dr. Joseph Holt visited Biloxi, and, thanks to him, the disease did not reach New Orleans.

As usual, ignorant and untruthful physicians were haggling as to what it was, while people were sickening and dying. Between that outbreak in

* See Ninth Biennial Report, State Board of Health of California, 1886, page 229.

+ See Ninth Biennial Report, State Board of Health of California, 1886, page 228.

September and October the seventeenth, or in a little over five weeks, over three hundred cases of fever were reported, with a total of eighteen deaths from all causes. Many of the cases were true specific yellow fever, properly so called. I make this statement upon the authority of gentlemen well versed in yellow fever, whose diagnosis was positive, and it was confirmed in several cases by black vomit, were confirmation necessary.

Now, to repeat, if there is one thing well known to the merest tyro in yellow fever it is that yellow fever never has appeared in any spot, city, or on board ship but that the disease has been traced to an infected individual or infected clothing; in short, that there was an absolute introduction of the specific poison of yellow fever.

The quarantine that existed at Ship Island, Mississippi, was but a quarantine in name. Had it been real, efficient, effective, the disease would never have been taken from those infected vessels into the town of Biloxi, and have led to the circumscribed epidemic already referred to.

Again, dwelling upon the present tendency to epidemics, I shall refer to the epidemic of yellow fever in Key West, Florida, in 1887. In my article, under the title of "Cuba as a Disease Producing and Distributing Center," that appears in this issue, a reference will be found to Key West and its immediate proximity to the early home of yellow jack, I mean the City of Havana. During the summer of last year yellow fever swept Key West, killing a number of citizens and causing the direst consternation. Hundreds fled, leaving in any sort of a craft capable of conveying them to the mainland. The course of the disease there was just what one would expect who is familiar with it; it exhausted itself and then became quiescent. I repeat, quiescent.

After leaving Tampa, Florida, early in December of last year, I paid Key West a flying visit and gathered some information regarding the history of that epidemic. I learned that it had been directly traced to a lot of bedding, and that said bedding had been used in a boarding-house in the City of Havana, and that there had been a death in that boarding-house from yellow fever. Later, its proprietor left Havana for Key West, taking her bedding and furniture with her. In her new home a case of yellow fever appeared. It needed but a spark, the magazine was full, and there was an explosion of the disease. The linking of cause and effect, in this simple way, emphasizes my early statement—in fact, not mine, but that of all students of yellow fever—that all cases and all epidemics of that dreadful disease can be traced to patients or fomites.

At a later period during the summer, after Key West had had her experience, a case of yellow fever appeared in Tampa. It was during the absence of my friend Dr. John Wall, the President of the Board of Health of Tampa. My readers will not be surprised to learn that an earnest effort was made to hush the matter up, and suppress all information. Interested parties lied, as interested parties generally do under like circumstances. Later more cases appeared, when it transpired that a smuggling schooner had brought the disease in from Havana. One case simply led to others, and when Dr. Wall got back he found a number of typical cases of yellow fever. As a profound student of the disease, and as a truthful and honorable physician, he grasped the gravity of the situation, and, seeking the greatest good for the greatest number, ordered all to leave who could get away; and to his care, prudence, and foresight hundreds to-day probably owe their lives.

Soon there was the usual explosion of the disease, when it took on epidemic proportions. I reached Tampa late in November. I visited it purposely to see what yellow fever in the Southern United States was like,

and to compare it with what I knew of yellow fever within the tropics. Thanks to my friend Dr. Wall, I saw case after case in the city and suburbs of Tampa, and, thanks to the courtesy of my friend Dr. J. Y. Porter, President of the Board of Health of Key West, Florida, then in charge of the yellow fever hospital at Tampa, I saw his patients and the notes he had taken on their cases. In short, during my brief visit to Tampa, I had every facility given me for seeing things exactly as they existed. I asked my own questions, obtained my own information, examined patients one by one, and obtained all the knowledge that I wanted regarding the nature of the disease in that city.

Despite the fact that yellow fever had swept the city, that dozens had died—the majority with black vomit—still there were those who questioned the knowledge and accuracy of the diagnosis made by Drs. Wall and Porter, and such was the bitterness against Dr. Wall for his truthful course, that I wrote a letter to the "Times-Union," of Jacksonville, indorsing all that they had said regarding the disease, and stating that it was yellow fever, properly so called. I also warned the people of Florida against "what assuredly awaits them next year." That letter appeared November 30, 1887. Now this may seem a remarkable statement, that a foreigner should deem it necessary, in the interest of the exact truth, to come out in the local press to indorse the statements of two well known professional men, whose position socially and professionally is of the highest; but it simply illustrates what willful ignorance and "the cursed love of gold" will lead conscienceless individuals to do—I mean a contemptible war upon truthful physicians, who staid in the field and fought the enemy while their cowardly accusers fled the field. In Tampa I saw and noted the condition of the city, its surroundings, the elevated temperature, and felt sure that the disease would be kept alive during their winter, so called—Tampa is below the frost line. Owing to the panic and fear, the houses had not been disinfected, and the stoves in them would keep up the necessary temperature to keep the germs alive awaiting the return of the summer days, when they would again be ready to continue their deadly mission. This summer there are many cases at Plant City, a few miles from Tampa. Cases were reported at Manatee. Local physicians denied that they were yellow fever and roundly abused Dr. Wall. After there had been seven cases he was sent for, and as he stood by the side of a woman dying of specific yellow fever, even then a physician questioned its being yellow fever. Later, when there had been more cases, they reluctantly admitted that Dr. Wall was right. In Plant City such was the feeling against Dr. Wall that he was burnt in effigy, and threats and no peace were his portion. Later they reluctantly admitted his wisdom.

On the third instant (August, 1888,) I left Havana per steamship "Mascotte," for Key West and Tampa. In Key West I saw Dr. Porter, and in Tampa Dr. Wall, when we discussed the situation freely. I then went on to Jacksonville, and learned from my friend Dr. Neal Mitchell, the President of the Board of Health of that city, that some days previous to my arrival there had been a suspicious case of sickness at the Grand Union Hotel, in that city. The patient was not his, but owing to the presence of yellow fever in South Florida, the hotel people became suspicious and sent for him. Dr. Porter was then on a visit to Jacksonville, and together they saw the case. It was pronounced yellow fever. The man was removed to the hospital at the sand hills, outside of the City of Jacksonville. Later other cases followed, and, as I had predicted, it took on epidemic form, and in that form it is prevailing to-day (August thirtieth).

In the "Evening World" of New York, of this date, I find the following,

being a telegram from Jacksonville of even date: "The temperature for the past forty-eight hours has ranged 93 to 97 degrees, and thirty-four new cases of the fever were reported last night with four deaths. This swelled the number of cases to one hundred and sixty-four, and the number of deaths to twenty-three."

What will happen between this and frost I do not care to predict, further than to state that if the month of September continues as hot as the weather they are having, in that month the disease will show its greatest activity.

Let us suppose the present epidemic over. If it corresponds with epidemics that I have studied in Cuba, in Mexico, as well as on the Isthmus, during next year, 1889, there will be a few cases in the City of Jacksonville. I say a few cases, but if the people who are at present outside, flock back into that city, it goes without saying that the disease will be true to its traditions dating back four centuries, and will do its work. Such, generally, is the history of yellow fever following an epidemic, and the peculiar danger that I wish to refer to is this: That if the disease appears next year in Jacksonville, and appears early, it may spread to other southern centers and develop new epidemics. Time will flatly contradict this forecast or emphasize it. If the precautions are taken that science dictates under such circumstances, the disease may be kept in the State of Florida and not devastate the South. Let us bear in mind how the disease was encircled at Biloxi, and stamped out in the fall of 1886.

My travels during the past winter simply confirm my views as to the present tendency to epidemics. I may state that I have been on the Spanish main, in the United States of Colombia, and in Venezuela; thence to the Island of Trinidad, thence to Barbadoes, thence to St. Thomas, thence to Porto Rico, thence to Santa Domingo and Hayti, to Jamaica, and on to Cuba. In all the places named, the heat and seasons have been very irregular. On the Isthmus of Panama there was the usual smallpox and yellow fever. The heat in Venezuela was almost unbearable; it was likewise very hot in Trinidad; and in Barbadoes, just previous to my reaching the City of Bridgetown, two creoles by birth, one of whom had never been off that island, had died of yellow fever—simply another proof of my oft repeated statement, that the only protection against yellow fever is to have experienced it.

Ere coming on to this city (New York), I spent two months in the Island of Cuba—a greater part of the time in the old City of Santiago de Cuba, nearly three centuries old. The season on the island was very irregular—excessive heat, want of rain, parched hills and fields, scarcity of water, etc.; in short, the conditions that precede and accompany epidemics were there, and the island was and is full of yellow fever, together with a great deal of smallpox. It has been noted time and again that smallpox and yellow fever pursue their course at the same time; again, one follows the other. In other words, such atmospheric conditions favor any epidemic.

Many Cuban physicians call yellow fever in the children of creoles *boras*, naming it after the grumous vomit. I can only repeat here what I have stated in another paper in this work, that acclimation is an old time and worn out myth; nothing protects against yellow fever excepting having had the disease, and by not losing the protection that it gives by long residence in cold climates. I mean, that to enjoy the full protection given one after recovering from yellow fever, properly so called, he or she must keep within the yellow fever zone; and, apropos of this statement, I may add that I have yet to meet any student of yellow fever who has seen a secondary case, properly so called. That it is possible to have it again when the protection is exhausted, no doubt is true, as we had secondary cases of

smallpox; but, unlike secondary cases of smallpox, I never have met a physician who could report a death; in fact, to repeat, I never have met a physician who has seen a true case of secondary yellow fever, and I have yet to read that a second attack, when it does occur, kills. Mind you, I mean yellow fever properly so called—the *disease with the usual symptoms and the invariable presence of albumen in the urine*. This statement explains itself to all students of yellow fever. In the localities where I became familiar with the disease, albumen is a *sine qua non*, and no case ever was diagnosed as yellow fever unless it was present combined with all the usual symptoms. I make this statement, as in many cases in the Southern United States, where there is a flushed face and twenty-four or thirty-eight hours, febrile movement, with a rapid pulse, without albumen, are called yellow fever. These, I believe, are the people who often claim they have had yellow fever twice. A crucial investigation of such cases will convince any tropical student of the disease, that such people did not have yellow fever as it is understood at Panama, Colon, Mazatlan, Porto Rico, or in the Island of Cuba. If they had had specific yellow fever, they never would have had it again.

We are in search of the truth, the only and real end of all inquiry, be it scientific or medical. Here I must draw this report to a close. If my readers feel disposed to find fault with any want of smoothness in this hastily written report, I crave their indulgence, and say, that the four reports sent forward to my friend Dr. Tyrrell have been dictated to a stenographer during four successive evenings, following long and busy days.

In conclusion, I wish to state that to rapid transit and want of the necessary quarantine regulations, both at Key West, Florida, and Tampa, Florida, both have suffered from yellow fever. At Tampa and Plant City the disease, as has been shown, hibernated during the past winter, and this year caused Tampa but little trouble, for reasons already given. It swept Plant City and now there have been many cases at Manatee.

Jacksonville owes her present epidemic to a man named McCormick, who forced his way into Plant City, returned to Tampa unobserved, got into a through sleeper that runs between Tampa and Jersey City, about August first, and went on to Jacksonville. The man was sick when he got into his section in that sleeper. His is the case already referred to, as having been found in the Grand Union Hotel.

The Jacksonville Board of Health, under Dr. Neal Mitchell, is making a magnificent fight, *but the disease has obtained a firm foothold, and despite the firing of cannon, prayers, or incense, it will go on.*

I do not wish my confreres to consider me a medical alarmist, but I want such of them as are interested in the welfare of their fellowmen, and who are earnest in their search for the exact truth, and the greatest good for the greatest number, to think carefully of what I have written, and perhaps they and others, combined with the press, may bring about measures that in the future will rob yellow jack of its terrors, and free the South from this terrible visitant that has cost her tens of thousands of lives and millions of damage.

If there is a disease known to the profession to-day that can be manacled, confined, or hemmed in by quarantine, it is yellow fever.

God grant that a time may be near at hand when those high in authority will recognize their great responsibility, and free this great republic from the reproach of yellow fever.

THE ISTHMUS OF PANAMA CONSIDERED AS A DISEASE PRODUCING AND DISTRIBUTING CENTER.

By WOLFRED NELSON, C.M., M.D., member of the College of Physicians and Surgeons, Province of Quebec, Canada; late of State Board of Health, Panama, South America; Correspondent State Board of Health, California, etc.

In the ninth biennial report of the Board of Health of the State of California, in a lengthy article under the heading "Yellow Fever Considered in its Relation to the State of California," I dwelt upon the peculiar methods that had obtained in the Panama cemeteries in times past. I referred to the old time Colombian custom of unburying the dead year by year, and digging over the small cemetery at Panama. I emphasized the danger of liberating untold millions of germs of smallpox and yellow fever under tropical conditions, where they would naturally take on new and death-dealing powers, not only leading to local outbreaks, but, owing to the fact that Panama is the gate to the Pacific, that these criminal methods (for I can call them nothing else) endanger all trading with the Isthmus, either on its Pacific side or on its Atlantic seaboard.

During March and April of this year (1888), I visited my old hunting grounds, and had a thoroughly good look at everything on both sides of the Isthmus. On the Panama side I visited the cemetery, that was opened during the summer of 1884 with inaugural addresses and a band of music.

Colombians are eminently fond of giving concessions; thus one man has a concession for selling opium, another man has an exclusive concession for all the gambling hells on the isthmus, a third holds a concession for a lottery, and last, but not least, the *omnium gatherum*, Señor Don Nicanor Obarrio, holds a Government concession for the burial of the dead. This may seem an extraordinary statement to make in this enlightened age, but it is so. No burial can take place in the Panama cemeteries without paying a fee of \$5 to Mr. Obarrio, he having the exclusive concession from the Federal Government of the United States of Colombia. This is a mere prefatory statement, but explains what will follow.

In July, 1884, the new cemetery, with its *bovedas* sections, was opened. The *bovedas* of the isthmus are those met with in the Spanish West Indies, in Spanish America, etc. They have been handed down from the time of the Spaniards. They are immense masses of masonry, built in tiers of openings or niches three stories high. By this I mean that you have a ground row of niches, each niche being a receptacle for a single coffin. Then there is a second row, and a third or topmost row, the whole built of masonry. Mr. Obarrio's concession naturally includes this, the ultra fashionable section of the Panama cemetery. Now to explain its *modus operandi*.

We will say that Fulano de Tal has been gathered to his fathers. Having dispensed with his medical friends, he is received by Mr. Obarrio and placed in one of these niches, the entrance to which may be closed either by brickwork or with a plain marble slab, with the usual inscriptions. Eighteen months' rent for this niche is paid in advance, a few, very few, becoming permanent settlers. At the end of the eighteen months, failing a renewal of the rent, Fulano de Tal is evicted, or, in other words, goes to

to the bone heap. Back of the old section of *bovedas*, in the old cemetery, I once counted coffins, more or less intact, seven and twenty in number. It was a sight even to a medical man. I can perfectly recall to memory seeing in one what had been the form of a woman with a magnificent head of hair, the remains of high heeled boots, and the paraphernalia belonging to people of upper tendom. These literal outcasts of society had been evicted owing to the fact that their friends had neglected to pay another eighteen months' rent, and, as the Concessionaire had attended to business on business principles, their places were wanted. I need not dwell upon the great danger of this shameful style of procedure. I refer to the distribution of disease anew.

Having temporarily disposed of the *bovedas* sections, we will now briefly consider the ordinary burial ground. Mr. Obarrio, who is always equal to the emergency, has grave diggers constantly opening series of new graves in some instances, and disinterring the temporary tenants in others. I am dealing with this matter in all seriousness, and it is simply another illustration of the fact that the truth is stranger than fiction, and that the horrible sights to be witnessed in the Panama cemeteries, or back of them, seldom get into print. During that visit to Panama I went out to the cemetery one morning, and took my traveling camera with me. I wished to obtain a series of views of the absolute condition of things, because they were so extraordinary, that I could not even expect my old intimate friends to accept the extraordinary statements that will follow without them. The cemetery that was opened in 1884 had been filled when I revisited the isthmus in 1886, and a part of a large field back of it was partly filled with new made graves. Speaking from memory, the highest number that I noted in the field, back of the cemetery proper, was 3,884 (refer to April, 1886). The graves that we are now considering mark the temporary abiding place of the middle classes, hospital patients, and the poor of Panama. A simple black cross on the upper portion of its vertical section, the year is painted in white figures—for instance, 1886, on the transverse section, or arm, the number of the grave, let us say 3,884, this number corresponding with the number kept in the books of Mr. Obarrio. So much for this simple way of burial. It will be but correct to state that there are a few tombstones in the cemetery, a very few private lots, but they are for permanent settlers. When I was on the isthmus, in 1886, they had not commenced digging up the new cemetery—I mean eviction, *a la Colombie*—but when I got there this year I found that the new cemetery had been dug up entire; that all the numbers were doubled, and that upwards of one third of the field back of the old cemetery had been dug over.

Now, to try to make my meaning clear. I have before me a photograph, and in the foreground is a grave bearing the number "3,059" on the crosspiece, "1886" above it, and below the word "perpetual." This is an exception to the rule, and for this reason I cite it. Back of it, where I made my photograph, I saw nothing but a line of black crosses, with numbers expressed thus: "3,025," "3,024," etc. Let us consider 3,024. Above that we have 1886, and below, on the same cross, 1888, the meaning of which is this, that the tenant of 1886 had been evicted, and a new tenant was introduced in 1888. Thus the same cross can be used time and time again, and it goes without saying that the last date represents the last tenant, or 3,024 of 1888.

To talk about a business in second hand coffins seems a bold statement to make, and, one would fancy, an exceedingly difficult one to prove; but such is not the case, for back of the stone wall, in the cemetery proper, there was a row of coffins that had been taken out of those graves—for the

most part common wooden coffins—placed there for sale. I do not enter into these details with a view of drawing a harrowing picture. I simply look at them from the standard of the sanitarian, and dwell upon them at length to point out this shameful and most criminal of practices of disinterring bodies by the thousands—not by the hundreds, by the thousands—having in view all the while that hundreds of these bodies, or the ashes that have been turned out under that tropical sun, amid all the receptive conditions that make disease an all-powerful agent—that hundreds of these were victims that died of yellow fever and smallpox. While a resident practitioner in Panama, together with the late Mr. John Stiven, we denounced the old cemetery, in the "Star and Herald," and the barbaric customs that had obtained for over half a century. Our denunciation was so pointed and strong, in the plainest of English and the most pointed of Spanish, that the Government stopped the vile practice, and for some years there was a little apparent decency and respect towards the dead. But, as will be gathered from the foregoing remarks, that period of respectability has passed over. Mr. Obarrio, the Concessionaire, found it easier to disinter the dead than to have his men break into the virgin soil in that vicinity. Not that it has any more value, for it has not, but it saved time and added immensely to his profits. As a direct result of the disinterring of the dead in the new cemetery, or what remained of them, the isthmus was visited by two epidemics of smallpox, and yellow fever is as much a part and parcel of the City of Panama and the City of Colon as it is a part of the City of Havana, already referred to in another paper. If the Colombians are satisfied to die, as the result of their own carelessness, so be it, but let them die without endangering others.

But for the fact that Panama and Colon are on the highway connecting two vast oceans, that tens of thousands of passengers and hundreds of thousands of tons of freight cross from ocean to ocean, and are distributed up and down the west coast of South America, the west coast of Central America, Mexico, and California, while much of it is shipped from San Francisco to Asiatic ports, and that Pacific cargoes passing from Panama to Colon are distributed all through the West Indian Islands, England, the Continent, and United States; but for this fact that the criminal practices now obtaining on the isthmus endanger each, and all of these countries, we might be satisfied to allow the Colombians to die in their own way. No fact is better known to students of yellow fever—for there is a wealth of literature on the subject—than this: That yellow fever was taken to the Isthmus of Panama in the earliest times. It raged on the isthmus, it crossed it, and it was distributed up and down the west coast of South America, Central America, and Mexico. Yellow fever thus is permanently domiciled on the west coast of South America. It swept the western coast of Mexico as an epidemic, and dealt its commerce a blow from which it has not recovered; and, quite apart from that, it has established itself in endemic form.

All that precedes, I trust, will be sufficiently suggestive to thoughtful men, and this article is simply written for them and sanitarians, that they may grasp the indescribable dangers that the unburial of the dead on the isthmus causes. We can picture to ourselves the crossing of hundreds of thousands of packages, goods from Europe and from American ports crossing the isthmus to be handed over, on the one hand, to the steamers of the Pacific Navigation Company, plying south, to the steamers of the Pacific Mail Steamship Company, plying between Central America, Mexico, and California; and on the other hand we can see the hundreds of thousands of packages of coffee passing from Panama to Colon, to be distributed

to ports in Europe, in the West Indies, and the United States. The man who has the courage to come forward and say that these things are not bearers of disease will be unwise in his generation, and show a lamentable ignorance in this advanced era of sanitary science.

Such is the exact condition of things on the Isthmus of Panama. It goes on, and it will go on, and the great outside world knows little of it, and no doubt hears less. Let us ask, on the other hand, what the isthmus has done in the shape of distributing disease. We have already shown that she has domiciled yellow fever on the west coast of Central America, Mexico, and South America. The late epidemic of smallpox that swept the Island of Jamaica came from the isthmus. There were upwards of eight hundred deaths in the Island of Jamaica. Next we have the disease appearing in the Island of Cuba, where, inside of twelve months, it had rolled up the fearful mortality of six thousand victims—I mean up to February, 1888. The old historic City of Santiago de Cuba, about ninety-four miles from Kingston, the capital of Jamaica, lost upwards of one thousand lives within a twelvemonth. It is thus that irresponsible Governments and conscienceless officials distribute pestilence and death in their headlong race for money and trade.

As I have stated in another article that appears in this report, we are indebted to commerce for much, and we are also indebted to it for the rapid distribution of disease, and for epidemic after epidemic. A word right here to those senseless writers who are constantly abusing quarantine measures and the other safeguards that common prudence and science have placed around nations, as well as cities. During the past winter I made two visits to the Island of St. Thomas, West Indies. All who are familiar with the history of the West Indies, and who may have read Trollop's "West Indies and Spanish Main," are aware of the fact that St. Thomas, in times past, was a by-word. She was swept by epidemic after epidemic. First cholera, next smallpox, next yellow fever. Her name was a by-word and reproach, and deservedly so. But what is her condition to-day? Denmark, the mother country, having noted the disrepute into which that island had fallen, adopted quarantine measures, and the result briefly stated is as follows: Owing to the vigilance of her quarantine officers there has been no yellow fever in that island for years, and not a trace of smallpox, and that despite epidemics all around her, and its past reputation of being one of the most insalubrious ports in the West Indies has gone. To-day that island is clean, healthful, and pleasant to visit, and I know of no point in the West Indies where strict quarantine measures have been attended with such perfect results. I make this statement *inter alia*, with a view of silencing writers who are opposed to quarantine, and who, in opposing measures adopted for the general good, are making themselves the creatures of those corporations that "have no souls to damn and no backs to kick;" and, in a measure, these men undoubtedly are responsible for the propagation of disease and death.

If there is one thing that is well known to even the merest tyro in yellow fever, it is the fact that never has a case appeared in any port, or on any ship, or in any quarter, but that the disease has been taken there by an infected individual, or by infected clothing, or by an infected vessel. And for those who wish to verify this point, I would recommend them to read the excellent article in "Ziensen's Encyclopædia," Vol. II, on yellow fever, and to refer them to the more recent and most excellent literature on the subject, published by a number of able French writers on yellow fever. They are the best authorities to-day.

Thanks to the kindness of my old and valued friend, Dr. Gerrard George

Tyrrell, Secretary of the State Board of Health of California, I am enabled to place my views before many readers. In common with him and many sanitarians, I am only anxious "for the greatest good for the greatest number," and hope by a persistent pointing out of this vile, indecent, and criminal practice, that the attention of Governments may be drawn to these irresponsible republics, and that they may be made to do what is right. In Europe, if a small State or country becomes "troublesome," the great powers say, "you must be quiet." Surely the time has arrived when nations, respecting their own rights and the lives of their own people, shall say to irresponsible republics like Colombia: "If you deal with us you must conform to the prescribed usages of civilization. You want our money for your goods; well and good, we will do business with you, but we will not accept the results of your criminal carelessness and introduce epidemics."

Now for a concluding paragraph, and it is one that I should like to have health authorities engrave on their mental tablets. It is this: It is customary with certain foreign Consuls at Colon and Panama to grant clean bills of health all the year round. I am happy to state that there are a few gentlemen speaking English on both sides of the isthmus, who have the courage of their opinions and cite the fact that yellow fever is there always, and if it were necessary to indorse their statements I shall here quote from a letter from Dr. Quijano Wallace, President of the Board of Health of the State of Panama. The letter that I refer to, was written on the thirteenth day of October, 1882, to Dr. Joseph Jones, then President of the Board of Health of the State of Louisiana. The paragraph translated into English, reads thus: "The actual sanitary condition of the ports of Panama and Colon is, generally speaking, good, as there does not prevail at present any of the usual epidemic diseases, it being a well known fact that smallpox, yellow fever, and the malarial fevers in their numerous varieties and forms, are never missing in these intertropical regions, where they are truly endemic."

If this paper is read in connection with that on Cuba as a disease producing and distributing center, it probably will throw additional light on this subject.

THE HOLT SYSTEM OF MARITIME SANITATION, OR AN IDEAL QUARANTINE.

By WOLFEED NELSON, C.M., M.D., member College of Physicians and Surgeons, Province of Quebec, Canada; late of State Board of Health, Panama, South America; Correspondent State Board of Health, California, etc.

In August, 1886, during a visit to the Southern States, I, through the courtesy of Dr. Joseph Holt, the President of the Board of Health of the State of Louisiana, visited the quarantine station on the Mississippi. Thanks to the courtesy of Dr. Thomas Y. Aby and his assistant, Dr. Ryan, I had every facility given me for seeing the exact working of that most admirable system—a system built up and developed from point to point under the able guidance of Dr. Holt. It was my intention to have written a report on that quarantine system for the last issue of the biennial report of the Board of Health of the State of California; but, having stayed some time in the South during great heat and moisture, it resulted in a severe bilious, remittent fever, and instead of sending the report on for publication, I became intimately acquainted with a private ward in St. Luke's Hospital, Jacksonville.

Between that date and this, fire has destroyed the quarantine station as I knew it in 1866. Last year, on my return from Cuba, per steamship "Hutchinson," I, together with all of her passengers, went through the whole process. While the fire undoubtedly upset the plans of the Board for the time being, the result as a whole, I take the liberty of thinking, has been undoubtedly beneficial, as the building used to-day is a substantial one, made of brick, whereas the earlier edifice was built of wood.

I will now endeavor to give you a word picture of what happened to the steamship "Hutchinson" and her passengers upon reaching the upper quarantine. The passengers and their luggage were disembarked. They walked along the pier to the building referred to. One room was allotted to the women and another to the men. Their trunks were opened and their contents taken out and placed upon movable frames that ran into a steam-tight chest of huge proportions. All of the effects were arranged on supporting bars inside what I take the liberty of calling a steam chest, the various sections of which had checks fastened on them externally, and a check corresponding with that number was given to the individual whose effects were on a given series of shelves or supports constituting a vertical section within the steam chest. Such, briefly told, was the way in which our effects were taken and placed within that steam chest.

Now, to deal with what followed. Within that steam chest were steam coils without number, for dry steam and for moist steam. The temperature ran up immediately to 230, a point at which, as all students of bacteriology are aware, germs and spores are killed. Later the compartment was filled with moist steam; thus the effects were first baked at a temperature of 230; then they were saturated with live steam at a temperature of about 230, and were allowed to remain within the chamber upwards of half an hour. At the end of that time the long, sliding vertical sections were drawn out, and the individuals received their effects, piping hot, but wholly undamaged. It will be well to add, at this point, that the finest

silks have been treated in this way without the slightest damage. While this process of killing germs, or any morbid particles, that might have become entangled in our effects while in Cuba, was going on, many of the coarser things, which could not be placed within the huge steam chamber, such as boots, shoes, rubber goods, etc., were thoroughly drenched with a solution of mercuric bichloride.

It will be but just to state that this excellent application of mercuric bichloride was first thought out and applied by Dr. Joseph Holt.

So much for the effects of the passengers and their luggage. Next let us get back to the steamer. While we had been absent a steam tug had been fastened to her starboard quarter, and a huge asbestos pipe had been adjusted to an opening in the main hatch. This pipe connected with a large furnace, in which sixteen pans were filled with burning brimstone. A current of air from without inwards was passing through the furnace, and the sulphurous acid gas thus generated was driven by a powerful steam pump through the asbestos pipe into the lower holds and all parts of the vessel. I may briefly cover this important section of the work by stating that it is most thorough and effective—so effective that all mice, rats, and cockroaches are killed. Time and again unfortunate cats that have been left on board have been killed. Thousands of feet of sulphurous acid gas are thus forced into all parts of the vessel under high pressure. The hatches are on, and the gas is confined for upward of two hours. All who are familiar with this most admirable of disinfectants and germicides know what a penetrating and all powerful agent it is.

I may state that vessels reaching the Mississippi, coffee-laden from Brazilian ports, have special shafts placed from the combing of the upper hatchway and extending to the floor of the lower hold, when such vessels reach the quarantine station. I saw one (the "Maranham") with a cargo of twenty thousand sacks, treated at the old quarantine station in the fall of 1886. Six hours was ample—a mere minimum of detention.

The decks and all parts of the ship are thoroughly washed with a solution of mercuric chloride, which the assistants spray over everything.

I have omitted to state that all the dirty linen from the ship, and everything of that nature, was taken on shore and thoroughly treated, so that it is simply impossible for any infected material to reach the City of New Orleans.

The mercuric solution used for the purpose of drenching the decks, disinfecting the bilges, etc., is kept in a huge tank at the end of the pier, a tank holding some ten thousand gallons. The steam tug has been fitted with all the necessary appliances—appliances that have been elaborated from point to point by necessity combined with experience. In the able hands of Dr. Holt and his assistant, they have evolved the most perfect system of maritime sanitation known to science or the world. As Dr. Holt stands *in loco parentis* to this system, I have taken the liberty of dubbing it "The Holt System." His it is, and his should be the honor.

Such, briefly told, is the expeditious working at the upper quarantine. I do not enter into details as to the boiler-room, the steam boiler, specially constructed, or the methods by which the steam chamber is supplied with live steam, and with dry heat. These I do not deal with; I simply deal with the results.

The passengers are not allowed to leave the quarantine station.

Among the passengers with me on the steamship "Hutchinson," on that trip from Havana, was Dr. J. W. Ekens, a gentleman already alluded to in another article in this report. We were greatly pleased with all we saw, but thought we discovered a weak point, in that the clothing worn by the

passengers themselves was not taken from them and disinfected, in the same manner as obtains in England when contagion or infection is likely to be carried about. Upon reaching New Orleans, and during a pleasant interview with Dr. Holt, we took the liberty of making this suggestion, when the system would be perfect in every detail. Dr. Holt received our suggestions in the frank and open way characteristic of that gentleman, and the day following he telegraphed the quarantine station that on and after that date all passengers should be supplied with a suit of their clothing that had been thoroughly disinfected, and that the suit that they had worn should be taken from them and put through the process of the steam chamber.

The exact beauty of the Holt system, briefly stated, is this: All germ life and spores are first and finally disposed of; secondly, cargoes are handled expeditiously at a minimum expense; thirdly, absolute protection is granted the City of New Orleans; and ship masters and passengers suffer but small delay, six hours to eighteen hours being ample for the purpose; and after the vessel clears from the upper quarantine for the Crescent City, she is sweet, safe, and healthy, and the State authorities know that vessels that have undergone this most crucial of treatments are not carriers of disease; they cannot be.

Now, to revert to some other phases of the quarantine system, as developed by Dr. Holt. On reaching the mouths of the Mississippi, the vessel is boarded by a medical man in the employ of the Board of Health. He makes a crucial inspection to see if there are any cases of infectious or contagious disease on board. If the vessel is clean, and there are no cases of disease, she receives permission to proceed to the upper quarantine, where all the steps already described follow. On the other hand, if there are cases of yellow fever or smallpox on board, she passes up the river a given distance and into an inlet, where the necessary steps are taken to disinfect her in the most thorough manner; her patients are placed in a small hospital, if necessary, and the vessel may be detained from four to six days, according to the requirements of the case, each and every case being treated on its own merits. If the passengers are disembarked, and the vessel has undergone the regular process of fumigation, disinfection, etc., she is allowed to proceed to the upper quarantine station, where each and all of the steps already described are enacted *de novo*—or, in other words, she undergoes double disinfection, fumigation, and cleaning.

With that best of knowledge, born of experience, Dr. Holt years ago refused to recognize even the so called clean bills of health from infected ports. I refer to the disease producing and distributing centers of Colon, on the Isthmus of Panama, and Vera Cruz, on the Atlantic coast of Mexico, and the various ports of Cuba. All of them are constant sources of danger to ports trading with them, particularly southern ports. Previous to 1884, when Dr. Joseph Holt was elected President of the Board of Health of the State of Louisiana, old-time methods obtained on the Mississippi, and owing to those old-time, unenlightened practices, commerce on the Mississippi during the summer was practically killed. The detentions were lengthy and the charges so heavy that commerce by way of the Mississippi during the summer, or fever months, was almost out of the question; but thanks to Dr. Holt's careful study, all that has been done away with. Trade by the Mississippi goes on in summer the same as in winter, it being practically unhampered, a result that could be obtained, and obtained only, by the most elaborate methods instituted by Dr. Holt. Unimportant branches of trade that hitherto were practically unconsidered, such as the banana trade, have taken on the handsome proportions of \$1,000,000 per

annum. For one consignment of coffee that was received under the old system, it will be safe to say that hundreds are received to-day; in short, that the old-time method of quarantine, which debarred Louisiana of her just maritime trade, is now of the past.

In concluding this brief and very hastily written article, it is but just to Dr. Holt to state that he is the father of this most admirable of methods of maritime sanitation, and that to-day in Central and South America, in Mexico and the West Indies, all health authorities speak of the Holt system with admiration.

Quite recently, when in Port of Spain, Trinidad, one of the British West Indies, I learned from Dr. Leonard Crane, C.M.G., the Surgeon-General of the island, and Dr. C. Burgoyne Paisley, its ever vigilant health officer, that a system somewhat similar to the Holt system is about to be adopted there. I simply cite this to show how the good work done by Dr. Holt is bearing fruit, and how science, thanks to the conscientious and indefatigable workers of his type, is making constant strides.

In conclusion, it will be safe to say that, knowing what we do of germs, germ life, germicides, disinfectants, and the like, Dr. Holt has combined all of the best methods for destroying germs, and the result is "An Ideal Quarantine."

THE QUARANTINE METHODS OF LOUISIANA.

By JOSEPH HOLT, M.D., President Board of Health.

In describing the methods of disinfection used in the quarantine of Louisiana, it is necessary first to examine the system itself synthetically.

There are three maritime approaches to New Orleans; the Mississippi, which is the central and main avenue; the Rigolets, thirty miles to the eastward, a narrow strait connecting Lake Pontchartrain with Lake Borgne, and the Gulf of Mexico; and the Atchafalaya River near its debouchment into the bay of that name, and Mexican Gulf, eighty-two miles to the westward.

On account of the character of shipping coming through the two lateral approaches, "light in tonnage, and mostly from domestic ports," the Rigolets and Atchafalaya are completely closed by a proclamation of forty days' detention against all vessels from quarantined ports, compelling such to seek the Mississippi as the only available route to New Orleans. This is done in order to avoid the immense expense of keeping up three completely equipped stations, and to concentrate at a single point the fight against infection.

The quarantine in the Mississippi is a system composed of three stations, the first of which is an advance guard inspection station, situated at Port Eads, one hundred and ten miles below New Orleans, where the waters of South Pass are jetted into the Gulf.

When an inward bound vessel comes into the offing, she is immediately boarded by a thoroughly skilled medical officer, and a careful inspection is made of her sanitary record and present condition.

If from a non-quarantined port, and all is well, she is given pratique, and goes on to the city. If from a quarantined port, but presenting a clean health record of voyage, and no evidence of sickness of a dangerous or doubtful character, she proceeds to the upper quarantine station, situated on the left bank of the river, seventy miles below the city, where she is subjected to a full course of sanitary treatment, and is detained such length of time, not exceeding five days (except in rare instances, where further observation may be deemed necessary), as the Board of Health may provide.

If, upon inspection, a vessel entering the river is found to be foul—that is, showing positive or suspicious evidence of infection, either in a person then ill, or in a foul health record of voyage—she is at once remanded to the lower station, located on Pass a L'Outre, an unused outlet of the Mississippi, one hundred and three miles below the city. The sick, if any, are at once removed to the hospital, where every provision has been made for them. The vessel, with the well on board, is dropped down stream a few hundred yards and anchored. In the meantime the quarantine tugboat, with its complete disinfecting outfit, has been telegraphed for and speedily arrives from the upper station, when the work of disinfection begins, and does not cease until the vessel has been subjected to the most vigorous application of solution of the bichloride of mercury; her atmosphere, below deck, completely replaced with one heavily charged with sulphurous oxide, and every article of baggage and ship's wardrobe has been saturated with the mercuric solution.

A ship known to be infested with one of the three great pestilential diseases—smallpox, cholera, or yellow fever—can stand and must endure extraordinary treatment, even if clothing is wetted and some articles damaged. "They who go down to the sea in ships" assume the perils of the voyage, among which is this occurrence of finding themselves on an infected vessel and being compelled to undergo a cleansing, for they have no right to bring their perils ashore and endanger others.

The immediate segregation of the sick and the well, and disinfection of the ship and all baggage (in the case of a cholera infected vessel extended to the disinfectant washing out and refilling of the water tanks, destruction of the food supply and revictualling the vessel) constitute the treatment of an infected vessel at this station. The ship, together with all on board, is held for observation a period of ten days, or more, according to circumstances, when she is released and proceeds to the Upper Station, where the processes of sanitary treatment are repeated, with the addition of the use of moist heat applied to baggage, ship's apparel, etc. (which latter process will be described hereafter), and the vessel is then allowed to proceed to the city.

This course of treatment at the Upper Station, while probably unnecessary, is enforced purely as an extraordinary precaution.

Inasmuch as infected ships are the exception, but inasmuch also as the Board of Health will take no risk in the case of vessels from known infected or suspected ports, regardless of bills of health, the vast majority of vessels are treated at the Upper Station.

Arriving at this station, the vessel is brought alongside the wharf. All on board—officers, crew, and passengers—are at once sent ashore, where they find ample accommodation in commodious shelter, provided for their entertainment during the time occupied in the sanitary treatment of the ship and all baggage.

As soon as this is completed they are permitted to return aboard ship, where they remain under observation during the prescribed period, determined by the remoteness or nearness of the port against which these precautions are taken.

The object of this brief detention for observation, after the sanitary treatment of the vessel has been completed, is to allow for a probable outbreak of an infectious disease already incubating in the system of any one on board.

As an essential part of the service there is a tugboat of sufficient power to move a sailing vessel to or from the wharf.

In addition to this requirement, this boat is equipped with a complete outfit for generating and applying germicidal gas for displacement of the entire atmosphere within the ship, transported, perhaps, directly from some infected port. In the hold of this tug is constructed a wooden tank of two thousand gallons capacity, to hold the bichloride of mercury solution for the treatment of vessels in the Lower Quarantine, as described. This tank is furnished with a steam pump (made of iron on account of the greater resistance of that metal to amalgamation) supplied with three-quarter-inch rubber hose. (See Plate 1.)

In the sanitary treatment of a vessel in quarantine, there are three processes of disinfection concurrently applied.

APPLICATION OF BICHLORIDE OF MERCURY.

The first is the wetting of all available surfaces of the vessel, excepting cargo, but including bilge, ballast, hold, saloons, forecastle, decks, etc.,

with a solution of the bichloride of mercury, made soluble by an equal weight of muriate of ammonia, in the proportion of one part to one thousand of water.

The idea of using this agent as a disinfectant in municipal and "maritime sanitation" suggested itself to me while reading the chapter on "Wound Disinfection-Antiseptics," in the volume entitled "The Treatment of Wounds," by Lewis S. Pilcher, M.D., containing an account of the experiments of Dr. George M. Sternberg, with a table of chemical agents and their relative germicidal strengths, at the head of which stands the bichloride of mercury, and also a table of the results obtained by Koch in Berlin, 1881, and by Schede and Kummel in the Hamburg General Hospital in the same year.

The Board of Health immediately indorsed the idea and ordered the adoption of the bichloride of mercury as explained in the following letter:

NEW ORLEANS, July 17, 1884.

Dr. THOMAS Y. ABY, *Resident Physician, Mississippi Quarantine Station:*

DEAR SIR: Because of the signal failure of carbolic acid as a disinfectant and prophylactic agent after a trial more fair and extended than has ever been allowed any other; because of its excessively offensive odor and oppressive and sometimes mischievous effects of its fumes; because of the low order of the commercial acid as a germicide, and the considerable expense involved in its use, you are hereby requested to discontinue its application.

In its stead I have ordered to your station two packages of bichloride of mercury and muriate of ammonia, the latter to act as a solvent.

In its preparation for use, take five and a half ounces of each, and dissolve in a half gallon of water; add this to forty gallons of water in a cask. I have sent three large watering pots, with a fine rose or spray. Your men can quickly wet down a ballast pile and all available surfaces of a ship, and it needs no repetition when once thoroughly applied.

The advantages of this agent are briefly these: The mercuric bichloride stands preëminently above all chemicals as a universal germicide. Not only are definite organisms immediately destroyed, but all protoplasms and albuminoids are devitalized by it. It is efficient to accomplish this work when applied in a solution so weak as not to be recognized except by chemical reagents. It is devoid of color or smell. It does not poison the air by vaporizing, but adheres in an innocuous form to the surfaces upon which originally applied. Its cost is about one eighth that of carbolic acid.

I feel that this transition is quite as much of a relief to you, my dear doctor, as to the afflicted people on shipboard, who must surely suffer severely from the stifling fumes emanating from carbolic acid applied to surfaces heated by a July sun, as the people of this city can testify to their terrible cost.

The position of persons confined on shipboard under such circumstances, particularly in the instance of women and children as passengers, as related by yourself, must at times be most distressing. The Board of Health heartily joins with you in the satisfaction and sense of relief afforded by this change, which is an important step in the great work of humanizing our quarantine.

I remain, with great esteem, yours very truly,

JOSEPH HOLT, M.D.,
President Board of Health, State of Louisiana.

The bold adoption of this poisonous agent in domestic, municipal, and maritime sanitation at once called forth a flood of most gloomy forebodings of fearful effects upon the human system.

Our declaration at that time is confirmed by an experience of four years' trial on an immense scale, that our standard solution, as used in sanitation, is absolutely harmless to persons unless swallowed, it matters not how extensive or constant the contact. The only objection we have yet discovered is that certain articles, particularly blankets and flannels, treated by the solution sometimes become spotted, and colors liable to "run" when wetted, suffer; but unlike all other chemical agents applied as disinfectants, the textile itself is in nowise injured.

Recapitulating its merits: being colorless, stainless (except as stated), odorless, not injurious to fabrics, perfectly safe to handle for months at a time, easily applied, and exceedingly cheap, it is impossible to imagine a substance more efficient and as free from objection in practice. It is, indeed, the key unlocking difficulties otherwise insurmountable, and rendering practicable in municipal and maritime sanitary work the efficient execution of scientific requirement.

The amalgamating powers of the mercuric salt presented many serious obstacles in the contrivance of an apparatus for its application, all of which have been overcome without sacrificing simplicity, efficiency, or economy.

Immediately adjoining the quarantine wharf and near its water edge, is constructed a heavy framework of piles, each twelve inches in diameter. This structure has an ample base, is pyramidal, and forty-five feet in height above mean level of the river. On top of this is a circular wrought iron tank, capable of holding eight thousand gallons of the mercuric solution. (See Plate 2.)

In order to prevent contact of the latter with the iron, the interior of the tank is painted over with three coats of red lead and two of paraffine paint. The top of the tank is closed by a secure cover, to prevent access of light to the solution. This, together with the general exterior, is painted black.

On the top of this cover is placed centrally a sixty-gallon wooden cask, in which is dissolved the mercuric salt, which is then emptied into the tank through a wooden faucet. Seventy pounds are used for one charge.

In the tank near the lower edge are three heavy galvanized iron faucets, to each of which is screwed a lead of three-quarter inch four-ply rubber hose, the farther ends of which lie on the wharf. These are lengthened by additional sections to reach any part of the largest vessel. To the far extremity of each hose is attached a short, wide nozzle, provided with a stop-cock.

During disinfection, all three are simultaneously used, fore, aft, and amidship.

For spraying, we use a perforated, heavy block-tin rose, four inches across the face, similar to an ordinary watering-pot spray. These are made with a shank about six inches long, to fit snugly into the open end of the pipe.

On a single vessel we average fifteen hundred gallons of solution, but often use three thousand.

The process requires from thirty minutes to two hours according to circumstances.

SULPHUROUS OXIDE FUMIGATION.

As soon as the men have completed the work of "bichloriding" below decks, the fumigating pipe is then extended from the quarantine tugboat lying alongside. (See Plates 1 and 2.) It is lengthened by sections, being

fitted together like stovepipe, and conducted down a convenient hatchway to the bottom of the hold or as near the keelson as possible, preparatory to the fumigation of the entire vessel (and cargo if any) with sulphurous oxide. In the case of a sailing ship, one hatchway gives access of the sulphurous gas to the entire hold; but in large steamers the hold is subdivided by bulkheads into two or more distinct compartments, which must be treated separately.

In undergoing treatment, the cargo is not disturbed, except when the removal of bags of coffee is required, to permit the passage of the fumigating pipe, which is twelve inches in diameter, down into the dunnage at the bottom of the cargo.

I have given explicit instructions to coffee importers whereby the expense of removing bags to make this well, or shaft, through the cargo may be avoided. It is necessary to have an open framework shaft, allowing a clear inside space of fifteen inches, placed in the center of the main hatch in a sailing vessel, or in the center of each hatch in a steamship having bulkhead compartments. The framework of this shaft is set before loading, and should be cut flush with the top of the cargo.

This simple arrangement avoids all handling and delay.

When the connections are made and the fumigating pipe is arranged, the fan on the tugboat is started and the process of displacing, with sulphurous oxide, the entire atmosphere within the ship begins.

The length of time required to complete the fumigation varies from thirty minutes to three hours, according to size of vessel, number of compartments, etc.

The quantity of commercial roll sulphur used varies from one hundred to seven hundred pounds per vessel.

The apparatus invented for rapidly evolving and supplying the germicidal gas consists in a battery of eighteen furnaces, each supplied with a pan to contain the sulphur during combustion. These furnaces open into a common reservoir, to the further end of which is connected a powerful exhaust fan. (Sturtevant's No. 29.) (See Plates 3 and 4.)

The gas drawn by the fan is driven into a twelve-inch galvanized iron pipe, through which it is conducted over the side and down the hatchway of the vessel into the bottom of the hold.

The gas, as it is driven into the vessel, is quite hot, but would extinguish rather than create fire.

The outflow should not impinge directly against bags of coffee or bales of textiles, if it can be avoided, in order to prevent formation of sulphuric acid and some slight injury therefrom at that point.

In treating coffee, and for convenience in some other instances, the vertical lead of pipe into the hold is made of asbestos cloth, closely and heavily woven for our purpose.

Every opening is closely battened during the process and remains so for at least eight hours after it is discontinued.

The apparatus throughout is made ample in size and power for rapidity of work and economy in wear and tear, by lessening velocity and friction. The fan is run by a special engine at a slow rate as compared with its capacity, but driving into the ship one hundred and eighty thousand cubic feet per hour of atmosphere surcharged with sulphurous oxide.

APPLICATION OF DRY AND MOIST HEAT.

While these two processes of sanitary treatment of the vessel are going on, all bedding, ship's linen, cushions, mattresses, flags, mosquito nets, cur-

tains, carpets, rugs, all personal baggage and wearing apparel of whatever description, are removed from the ship to a commodious building in close proximity (see Plate 5), in which these articles are treated by moist heat at a temperature of not less than 230 degrees F.

The apparatus for this work consists in a steel, forty-horse power steam boiler (see Plate 9), for supplying steam to a superheating chamber a few feet distant, and which I will now describe. (See Plates 6, 7, and 8.)

The dimensions of this chamber, taken interiorly or inside measure, are sixty feet long, eleven feet wide, and seven feet high.

The framework is composed of three by three inch seasoned pine lumber, joined as in the construction of a frame house. Upon the outside of this framework (and corresponding to weather-boarding in the case of a house) is nailed tongued and grooved flooring material three fourths of an inch thick by six inches wide.

The inside or interior of the ends, rear, and top of the chamber is ceiled with the same material and a flooring of the same is also laid. Upon these interior surfaces is tacked heavy "Russian haircloth or felting;" and upon this, at intervals of three feet, are nailed parallel strips of wood one and one half by two inches, and, in turn, upon these strips is fastened another sheathing or ceiling of flooring plank, as already described.

This secures an air space between the haircloth and inner ceiling. Upon this now smooth interior surface of wood is finally tacked and held in place by very broad-headed nails, or better, by nails supplied with tin discs or washers, a double layer of "asbestos building felt," well lapped and securely tacked; thus rendering the interior of the chamber fireproof.

By the foregoing described construction it will be seen that the walls of the chamber, which are eight inches in thickness, consist of seven non-conducting media; first, the outer layer of planking; second, three inches of air space; third, an inner ceiling of planking; fourth, one inch thickness of "Russian haircloth;" fifth, one and one half-inch air space; sixth, a third layer of three fourths inch planking; seventh, a double layer, or interior lining, of heavy asbestos felting.

The front wall is divided into forty panels, eighteen inches wide each (see Plate 6), which represents that number of racks contained within the chamber.

Upon the bars of these racks the clothing, etc., is hung for exposure to disinfection by moist heat. (See Plate 7.)

These racks are constructed with a front and rear panel united by horizontal bars, six to each side. Each rack is suspended overhead, on traveling rollers, upon an iron rod which extends from the rear wall of the chamber to a support ten feet in front of the chamber; the rod, therefore, being twenty feet in length.

By this arrangement overhead, the racks may be drawn out and pushed in with facility, thus avoiding tracks or rods on the floor obstructing the movements of employés.

When drawn out the full length of ten feet, the rear panels of the racks securely close the chamber, as do the front panels when the racks are pushed in; thus admitting of the heating of the chamber during the time of hanging the articles of clothing, etc., on the rack bars preparatory to disinfection.

For this admirable device and, indeed, for the entire skeleton of the superheating chamber, including the dry heat double steam coils, we are indebted to the Troy Laundry Machinery Company, Chicago, Illinois. We have found the purchase of this apparatus, constructed to include

certain of our specifications, to be the most economical and satisfactory we could have desired.

The interior surface of each front panel is lined with a layer of Russian hair cloth, over which is applied a double layer of asbestos felting.

At intervals of seven and one half feet a bulkhead of one inch tongued and grooved flooring is constructed, subdividing the chamber into eight compartments. These bulkheads, or partitions, are made fireproof by a covering of a double layer of asbestos felting. The object of this arrangement is to provide against the spread of fire in the event of its occurrence.

In addition to this provision there is a double lead of one inch fire hose connected with a steam pump near the boiler, and at all times ready, within fifteen seconds notice, to turn on two streams of water upon any rack on which fire might have originated.

These minute specifications concerning provision against fire are particularly appreciated by ourselves; it cost us two fires and the destruction of a large amount of property to learn a lesson which experience alone could teach. Lacking experience and precedent, these accidents could not have been foreseen, and, therefore, could not have been provided against. They were the result of an underrating and failure to appreciate the prodigious force which the contrivance invented placed at our will to invoke.

Under the present arrangement, including early use of free steam, fire is hardly possible; but if it should occur we are prepared to draw out instantly the burning panel, to strip it of clothing, and to put out the fire.

With reasonable care and watchfulness on the part of the employés there need be absolutely no danger of loss by fire.

The superheating of this chamber is so provided as to furnish at will dry or moist heat, or both; and by a turn of the hand a temperature of 300 degrees F. can be obtained.

Within and at the end of this chamber next to and connected with the boiler are two manifolds, one above the other, to which is connected a system of forty-five three quarter-inch steam pipes (aggregating five thousand five hundred and nine lineal feet), placed horizontally near the floor of the chamber, running its full length, and supplied with a "bleeder" for conveying off the water of condensation.

This double coil furnishes the dry heat. (See Plate 8.)

Above and in close proximity to this system of pipes is extended a horizontal screen of galvanized iron one half-inch mesh, to catch and so prevent the coming in contact with the superheating pipes, any article falling from the racks. (See Plate 7.)

The moist heat is supplied by a one inch steam pipe laid centrally in the midst of the above described dry heat pipes and running the entire length of the chamber, constituting a steam main, connected with the boiler and controlled, as the others, by a ball-valve on the outside.

This pipe is perforated by eighty one twelfth-inch holes, so placed as to furnish steam to each rack.

During the time of hanging the articles of clothing, etc., on the racks, the dry heat is turned on and the temperature raised to about 190 degrees F., made known by a thermometer having a large mercurial column, and suspended near the center of the chamber, working on a slide or traveling rod in such a manner, when it is desired to make a reading, as to allow of being drawn forward (by a cord extending outside) to a long, narrow pane of glass set in the panel. This thermometer should have a scale of at least 275 degrees F.

As each rack is filled it is put back into place. By the time the last of the articles has been hung on the racks, the entire mass of the material

within the chamber has attained a temperature between 190 degrees and 200 degrees F., when free steam is turned on, the thermometer speedily rises to a point varying between 230 degrees and 240 degrees F., at which it is maintained for a period of twenty minutes.

The steam pressure in the boiler, at the beginning of this process, registers between one hundred and one hundred and ten pounds by the steam gauge; at the end of the process of blowing in steam the pressure will have fallen to about sixty pounds.

The steam is now entirely cut off from the chamber, the racks are drawn out, and their contents removed.

During the process of steaming, every article is perceived to be saturated and intensely hot, the steam freely permeating to the interior of mattresses, double blankets, etc.; but so great is the heat in the texture of the fabrics as to immediately expel all moisture upon drawing the racks and exposure to the open air. Shirts, collars, etc., instantly assume the crisp dryness they possessed before exposure, losing the musty smell of long packing in a trunk. Silks, laces, the most delicate woolen goods show no signs of injury whatever from the treatment.

Of course, articles of leather, rubber, and whalebone would be injured by the heat and are therefore disinfected with the mercuric solution and not permitted to go into the heated chamber.

Time required to charge chamber with apparel for disinfection, thirty minutes; time required for moist heat, twenty minutes; for removal of articles, fifteen minutes; a total of sixty-five minutes.

A large steamship, particularly a passenger vessel, may require two or three charges of the chamber. Amount of coal consumed, from two to four barrels per vessel.

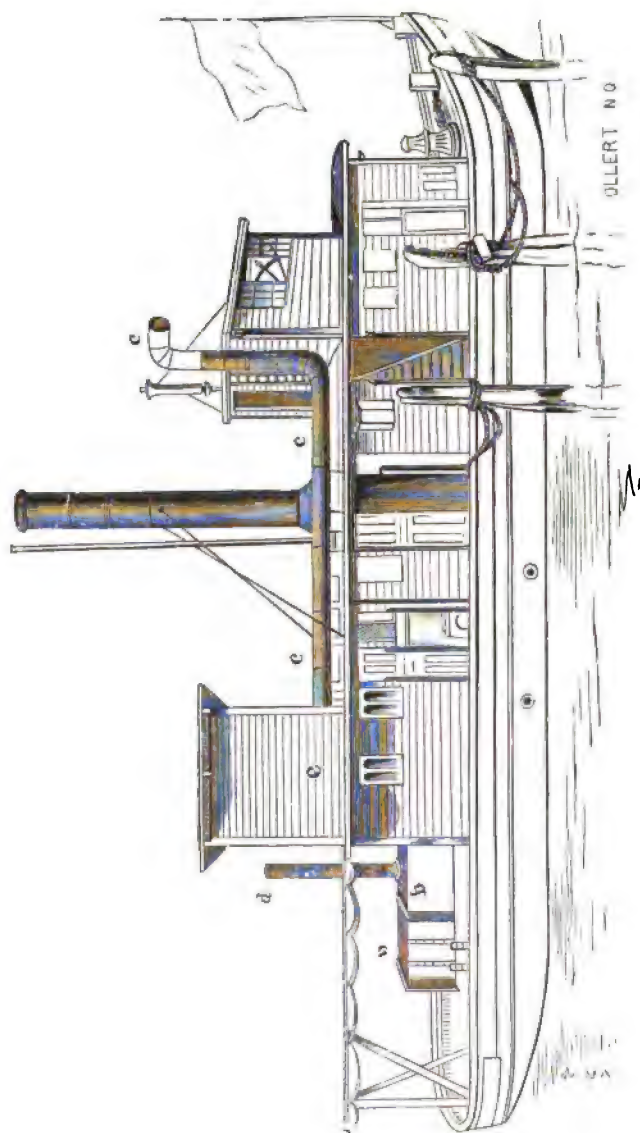
In the summer of 1885 we devised and put up a chamber of the above general plan, but wholly inadequate as to size for the requirements of our service. This was replaced by one operating on the same principle, but fifty feet long and supplied with a twenty-horse power boiler, which latter proved too small for rapid work. This apparatus was burned last spring.

Our present chamber and supply boiler are of the dimensions given in the appended plates.

We prepared the plans of the foregoing described apparatus during the summer of 1884. Obtaining a liberal appropriation of \$30,000 from the State Legislature for the avowed purpose of establishing a new system of quarantine through the elaborations of purely experimental work, and thoroughly indorsed and sustained in all our efforts by the progressive spirit of the press of New Orleans and by the merchants, we put the new system into practical operation and threw open the Mississippi to commerce June 10, 1885.

As it stands to-day (we sincerely believe in a nearly perfected state), it is the consummation of experimental effort, through a long and tedious process, beset with difficulties of the most perplexing and often disheartening kind.

Without precedent; having to deal with natural forces of prodigious power; repeatedly encountering unexpected difficulties; meeting with accidents; obliged continually to devise improvements upon our several inventions, and continually combatting a surly discontent and sometimes violent opposition from those subjected to the sanitary processes while these were still in an imperfect and unsatisfactory stage of development; the modernizing of quarantine and bringing it into line with other branches of science and art in the general progress, has been an expensive and difficult task.



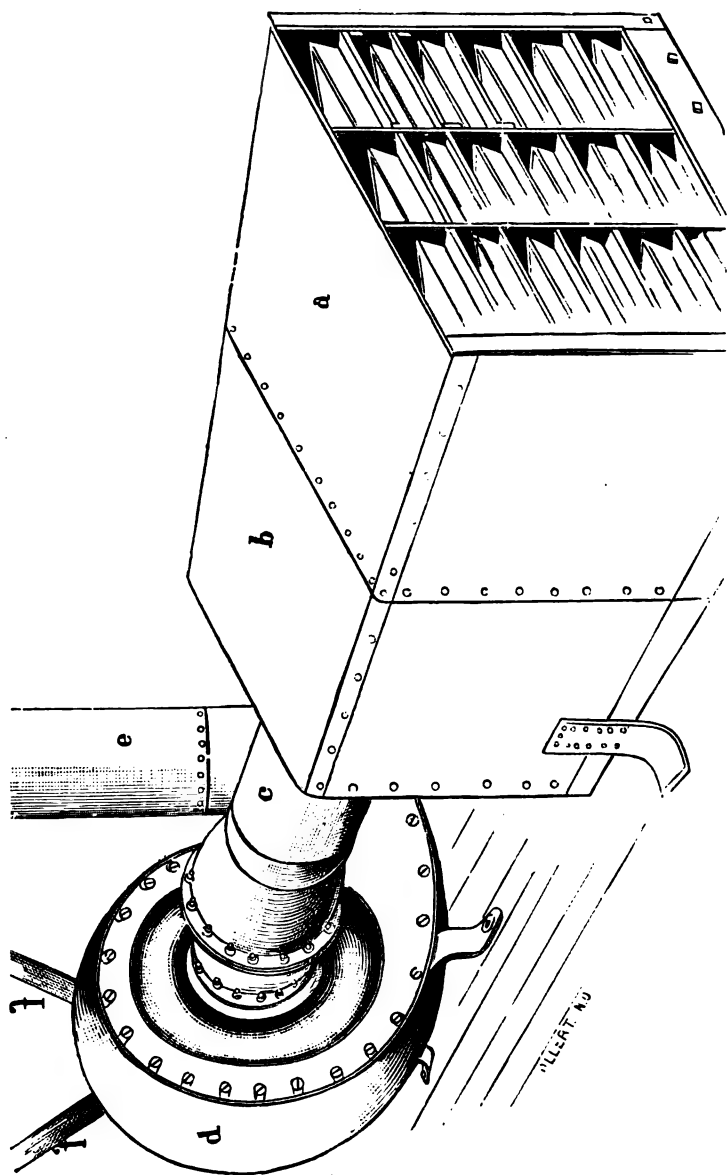
(PLATE 1.) TUGBOAT WITH FUMIGATING APPARATUS.

a. Furnace. *b.* Reservoir for reception of gas. *c.* Discharge pipe, conveying gas to ship's hold. *d.* Escape pipe for gas when fan is at rest and sulphur burning; closed by a valve when fan is in motion. *e.* House protecting from weather the machinery for driving fan and containing accelerating gearing.



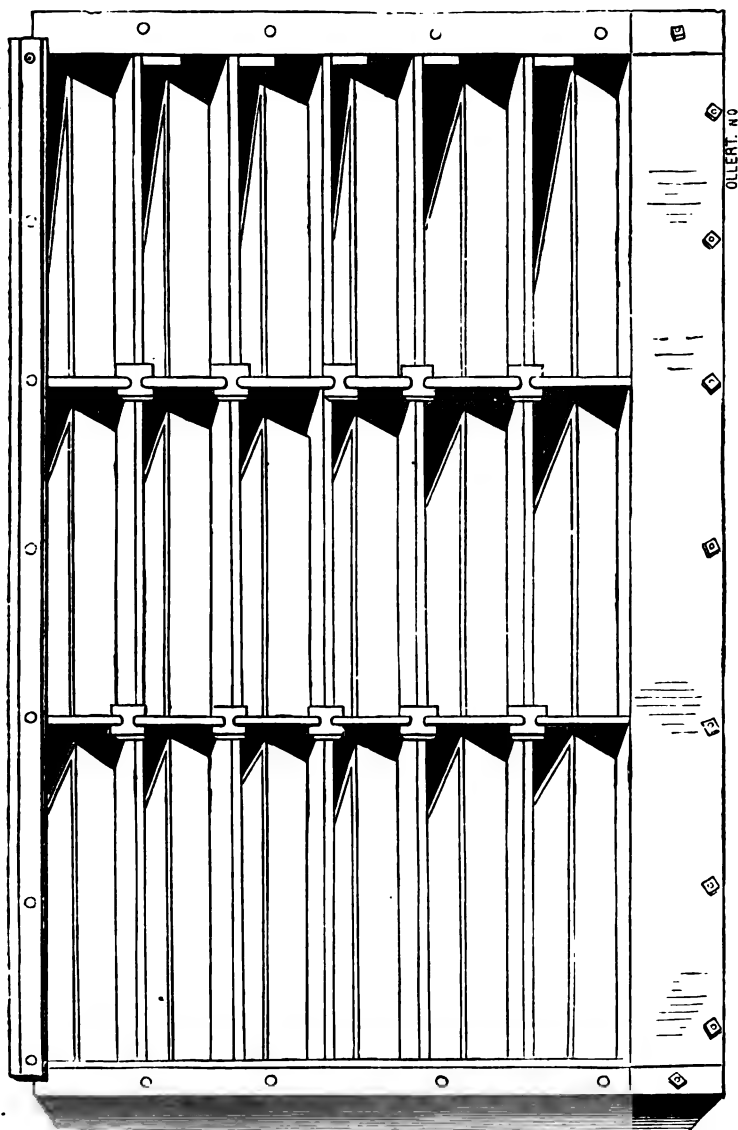
(PLATE 2.)

View of disinfecting wharf, showing tug fumigating vessel; elevated tank containing 3,000 gallons of bichloride of mercury solution, three leads of hose from tank to ship. Gangway leading to building containing superheating chamber.



(PLATE 3.) FUMIGATING FURNACE, RESERVOIR, AND EXHAUST FAN.

a. Furnace of cast iron, $\frac{1}{4}$ inch thick, 3 feet wide, 3 feet long, 2 feet high. Upper and lower plates grooved for reception of partitions, and sides shouldered for same, as shown in Plate 4. b. Reservoir, No. 10 iron, same dimensions as furnace. c. Exhaust pipe connecting reservoir and fan, as shown in Plate 4. d. Exhaust fan, Sturtevant's No. 20, Medium Planing Mill Exhauster. e. Discharge pipe from fan, made of No. 20 galvanized iron. f. Driving belt. Height of legs supporting furnace and reservoir, 10 inches. On reservoir, at letter (b), should be shown a 12-inch opening for escape pipe, as indicated (d) Plate 1.



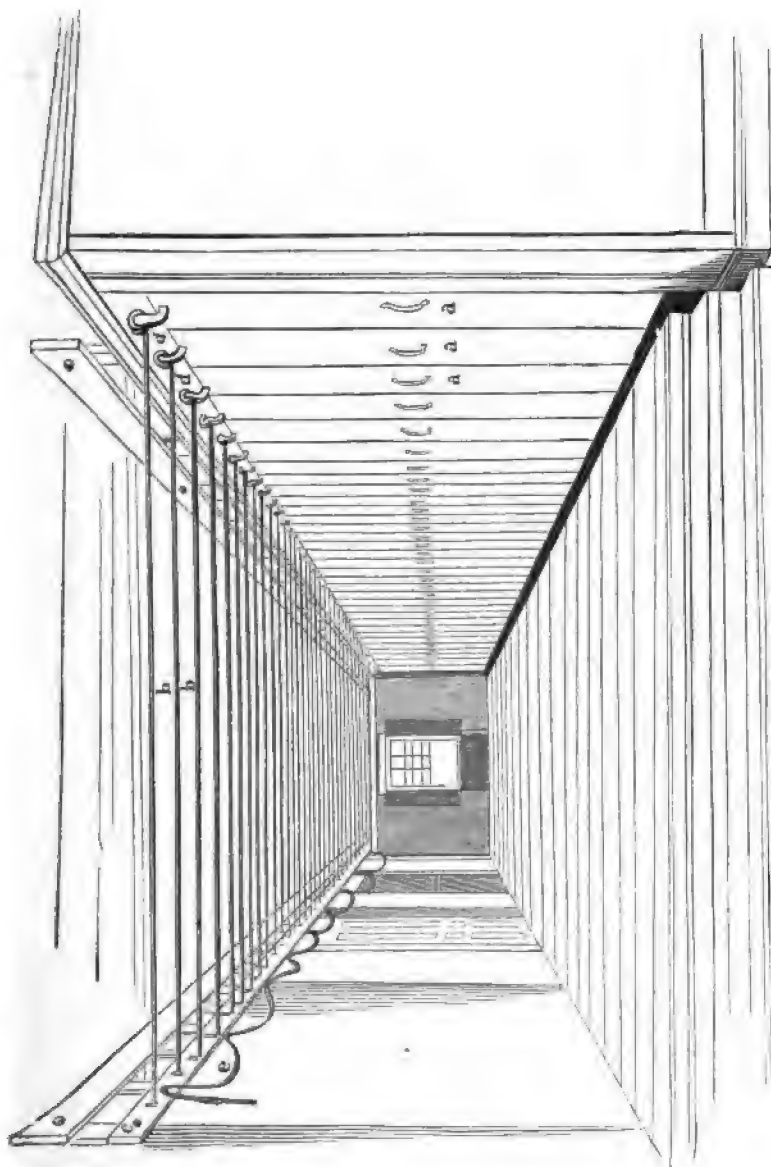
(PLATE 4.) FRONT VIEW OF FUMIGATING FURNACE.

Dimensions of each compartment, 12x34 inches. Pans of cast iron $\frac{1}{8}$ inch thick, 11 inches wide, and 2 feet 10 inches long, outside measure. Free space above pan about 14 inches.



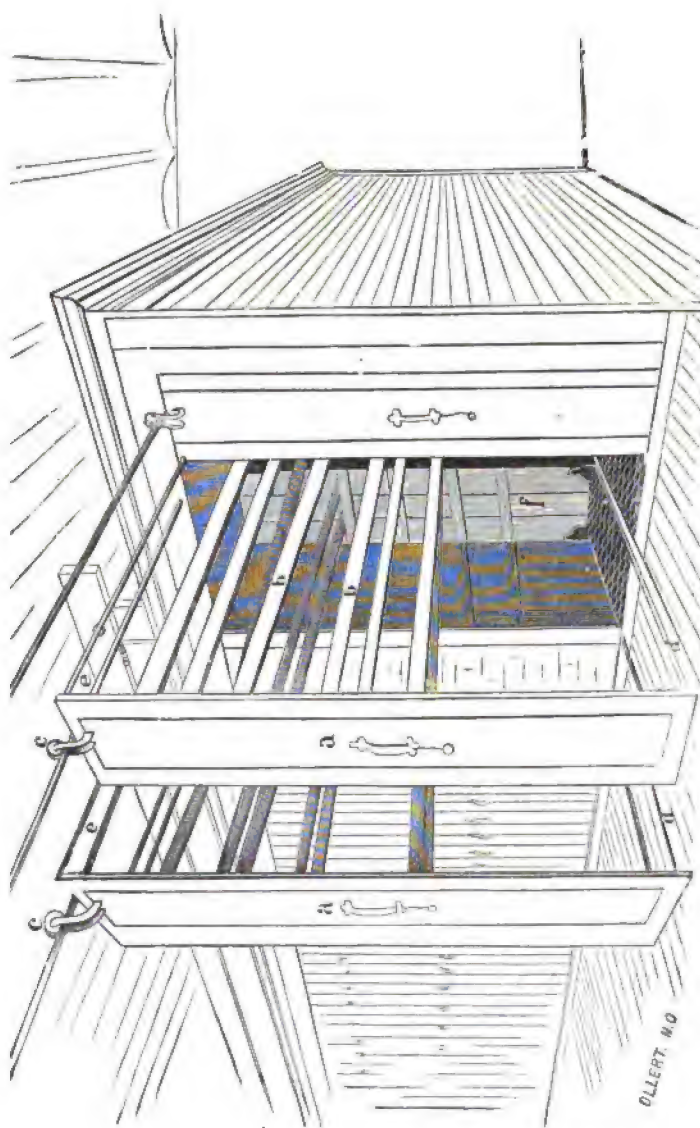
(PLATE 5.)

Brick building in which is located the superheating chamber; gangway in front connecting with disinfecting wharf.



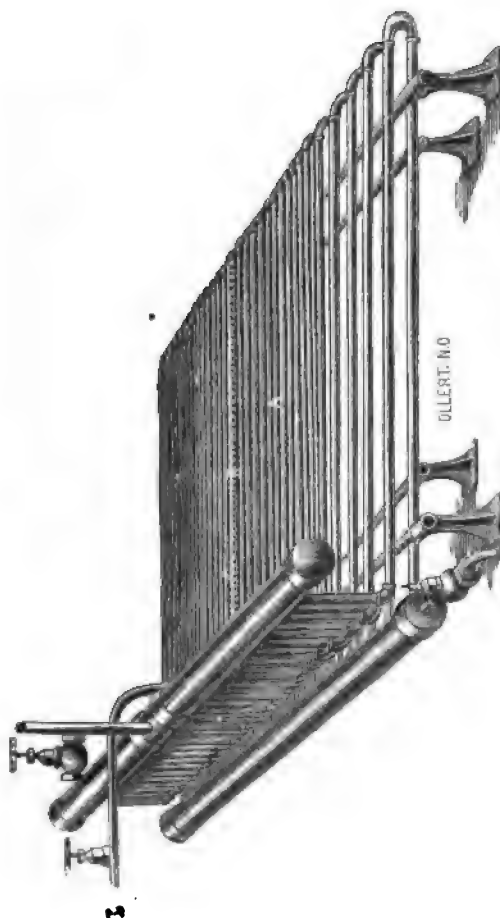
(PLATE 6.) FRONT VIEW OF CLOSED SUPERHEATING CHAMBER (60 FEET LONG).

a. Panels. *b.* Rods upon which panels are suspended and travel. *c.* Outer support of rods. *d.* Rollers suspending panels on rods. *e.* Fire hose.



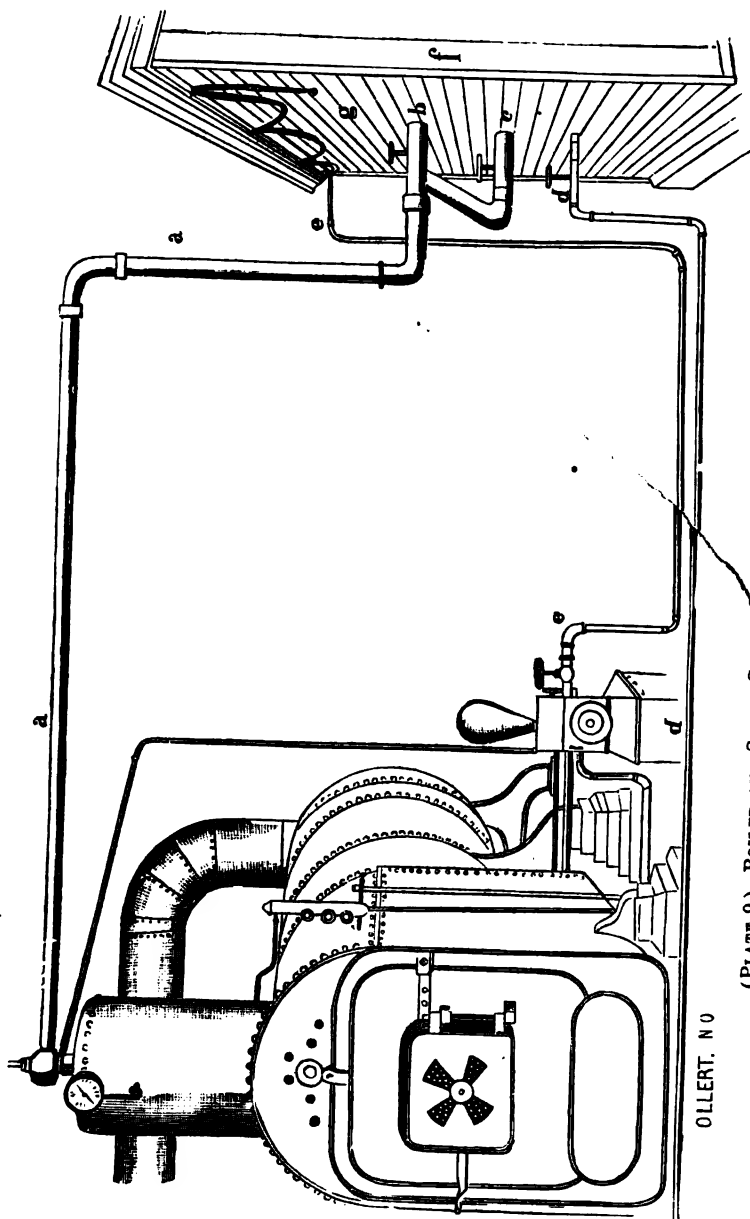
(PLATE 7.) SUPERHEATING CHAMBER, TWO PANELS DRAWN OPEN.

a. Panels. (Two lower rack bars not shown.) b. Rack bars. c. Rollers. d. Iron bars connecting front and rear panels. e. Rods upon which panels are suspended and travel. f. Rear panel. Galvanized iron $\frac{1}{8}$ inch mesh screen in bottom of chamber.



(PLATE 8.)

Superheating steam coil for dry heat. b-b. Perforated steam pipe for moist heat.



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(PLATE 9.) BOILER AND STEAM CONNECTION WITH SUPERHEATING CHAMBER.

a. Steam-main from boiler. b. Pipe supplying dry heat. c. Pipe supplying moist heat. d. Bleeder. e. Pipe from pump supplying fire hose. f. Front of chamber. g. End view of chamber.

REPORT OF H. S. ORME, M.D., DELEGATE TO THE FIFTH ANNUAL CONFERENCE OF STATE BOARDS OF HEALTH.*

The Conference, composed of one or more delegates from each State Board of Health, was held in Cincinnati, Ohio, May 4, 5, and 7, 1888.

The various questions discussed by the Conference had previously been formulated by the Boards of Health of the several States, and of the Provinces of Canada. These questions, with slight modifications, formed the programme or order of business of the Conference. Many subjects were discussed which vitally concern the Pacific Coast, so that it was very important for California to be represented. The following is a brief synopsis of the proceedings:

The President, Dr. McCormack, of Kentucky, opened with an address in which he urged the necessity of a better system of quarantine, and especially drew the attention of the Conference to the ever present danger of a visitation from Asiatic cholera. The exposed condition of the port of New York, and consequently of the whole country, he said, was chiefly due to political dissensions.

Upon motion of Dr. Thompson, of Kentucky, the matter of the President's address was referred to a special committee.

The question proposed by the Provincial Board of Ontario, "The duties of the Conference in urging the erection of isolation hospitals for treatment of infectious diseases (scarlatina, diphtheria, etc., as well as smallpox), as a more economical and effective method than placarding houses and quarantining families where the diseases are present," was the first subject discussed.

Dr. Bryce, of Ontario, read a paper advocating the establishment of such hospitals. In London and in Glasgow there are hospitals for the treatment of typhus, and in New York there are typhus and smallpox hospitals. He advocated hospitals on the pavilion plan, or in groups of isolated cottages.

Dr. Probst stated that in Ohio local Boards had the authority to erect pesthouses and remove patients, but that authority was never exercised except in cases of pestilential diseases, such as smallpox. The families of the higher classes, moreover, would not consent to give up their children.

Dr. Thompson said that the government did not exist in any of the States that could carry out such a system. Where is the man who has the temerity to take a child out of bed, suffering with diphtheria three or four weeks, to one of the hospitals?

Dr. Baker, of Michigan, favored the establishment of such hospitals. "Diphtheria and scarlet fever are more important than smallpox. In our State we are aiming at removal of cases of diphtheria."

Dr. Lee, of Pennsylvania, considered the establishment of such hospitals was only a question of time. The people would soon regard them as a refuge and relief, rather than a means of tyrannical and cruel invasion of their rights. In Philadelphia, in cases of smallpox, the health authority

* Through an unforeseen accident this report was overlooked until it was too late to insert it in its proper place, after the Secretary's report; it was therefore thought proper to insert it here, with this explanation. (Ed.)

had the power to remove the patient against the wishes of the family. The Courts have sustained this view both in Philadelphia and in Pittsburg.

Dr. Thompson, of Kentucky, stated that in 1878 the matter was tested through the Courts of Florida and the Supreme Court, the Courts deciding that you had not the power to remove a patient. In Kentucky it was decided that you could isolate patients, but not remove them.

Dr. Hewitt, of Minnesota: "The rural population *do* want isolation hospitals. We have seen it time and again among our Scandinavian population that a cow house was used to isolate a sick child and its mother. Our people are learning the necessity of isolation, and, in cases of sickness, demanding it."

Dr. Orme, of California, said that in his State they had the power and authority to remove people from the hotels and boarding houses, but not from private homes. "In cases of smallpox, if we could go in and remove people, we could stamp out the disease right then and there. We have to placard and guard infected houses. This is the more necessary in my State because the native population, as a rule, are not afraid of smallpox."

Dr. Bryce closed the discussion, and the whole subject was then referred to a special committee.

The question proposed by the State Board of Health of Indiana was then called up: "Is it advisable to attempt to unify the method of procedure of the various State Boards of Health?"

After a brief discussion, Dr. Taylor, of Indiana, offered the following resolution:

Resolved, That a committee be appointed whose duty it shall be to examine the laws and methods of procedure governing the various State Boards of Health and those of the Provinces, and from them to construct a system of laws and procedure such as shall meet the approval of this body. Be it further

Resolved, That when such system or code is accepted by this body, every legitimate means be used to cause such to be enacted by the Legislatures of the several States.

The resolution was referred to the special committee, already existing on that subject, for consideration.

The questions, "Should the National Government assume the control of quarantine at all ports of entry?" (proposed by the State Board of Pennsylvania) and "Under which control should quarantine be, both in Canada and in the Union—under Federal Government (National), or under Provincial or State Governments (local)?" (proposed by the Provincial Board of Quebec), were discussed together.

Dr. Lee read an exhaustive paper, showing that, under the Constitution, Congress had the power to control maritime quarantine, and that it was only through the National Government that an efficient system for the protection of the whole country could be established. At the close of his paper he offered the following:

Resolved, That this Conference, recognizing the failure of the local authorities to administer quarantine effectually in a large number of cases, respectfully urges upon the National Government the duty of assuming control of quarantine at all ports of entry.

Dr. Hewitt said: "In the present emergency we cannot depend upon Congress. Even if obtained, an appropriation would not be available until July, and as the hot season approaches it behooves us to act promptly in some other direction."

Dr. Rauch, of Illinois: "The trouble with sanitation in this country is the difficulty of keeping politics out of legislation relating thereto. I am in favor of National quarantine, but I am opposed to the Marine Hospital Service having absolute control of it."

Dr. Baker, of Michigan: "I have no confidence in a National system of quarantine. We should not attempt to take away State control over this matter; the General Government should only aid the States in emergencies."

Dr. Orme, of California, said: "We should be friendly and try to act in concert with the Marine Hospital Service. They have done some good work. At the request of our State Board they placed inspectors in the Territory of Arizona, at Nogales and Yuma, to protect us from Mexico."

Dr. Thompson, of Kentucky, thought there were only two diseases with which the National Government ought to have anything to do—yellow fever and cholera.

Dr. Lee, in conclusion, was sorry that any members of the Conference should be influenced by prejudice.

The vote on the resolution was postponed, and Dr. Lee afterwards offered the following substitute, which was unanimously adopted:

Resolved, That this Conference heartily indorses the bill now before the Congress of the United States proposing to establish seven well equipped quarantine stations at certain points on the Atlantic and Pacific coasts, and urges that early action be taken upon the same; it also urges upon Congress the passage of the proposed Act to establish a National Bureau of Health.

The question, proposed by the State Board of Michigan, "What should be done to prevent the continued introduction of those dangerous communicable diseases, diphtheria and scarlet fever, which are common in this country, and which, therefore, cause the most deaths?" was next discussed.

Dr. Baker offered a resolution that these diseases be classed as pestilential and treated by quarantine.

Dr. Rauch, of Illinois: "The question is, who is to pay for this quarantine of foreign ships that bring in all sorts of disease? This is a question not alone of sanitary importance, but of national. It was only by a miracle that we escaped cholera last year. The New York authorities detained the "Alesia" only ten days, with six hundred and fourteen passengers from Palermo, a city in the cholera infected district. The more sanitary restrictions we throw upon immigrants the better for this country. Several epidemics of cholera have broken out in inland towns after the immigrants had unpacked their baggage—showing the want of proper disinfection at our ports of entry."

Dr. Thompson and Dr. Reeves thought that little could be effected by quarantine, Dr. Thompson maintaining that these diseases frequently originated *de novo*, without a preëxisting case.

Dr. Orme contended that cases of diphtheria and scarlatina should be isolated and quarantined against as carefully as smallpox or cholera.

Dr. McCormack considered this the most important matter before the Conference. More people have died in Kentucky in any one year from these diseases than had ever died from yellow fever and cholera.

Dr. Rauch held that there was no necessity for either of these diseases; quarantine would shut them both out.

Dr. Lee stated that there was a time when diphtheria and scarlatina were unknown in this country; they were introduced from abroad.

Dr. Hewitt was in favor of quarantining against them, if practicable. Of course, ships with these diseases on board should be quarantined, but between the different States it would be exceedingly difficult, if not impossible.

Dr. Reeves offered the following substitute for Dr. Baker's resolution:

Resolved, That in the judgment of this Conference the interest of public health will be conserved by emphasizing the fact that diphtheria and scarlet fever are diseases of such

highly contagious and infectious character, that they should be dealt with by the most complete isolation of *all cases*, the most thorough disinfection of all infected articles and places, and by quarantining at the seaboard, and at all other places, with the same care that is taken with reference to smallpox or cholera.

Adopted.

Dr. Baker, of Michigan, offered the following, which was unanimously adopted:

WHEREAS, It is alleged that yellow fever is now present in Florida, a State not represented here because it has not a State Board of Health, and which is in daily communication with other States, and thus threatens all those of our States in which that disease can prevail; therefore,

Resolved, That all Boards of Health in States adjoining Florida are urged to immediately and continually exercise extreme care to keep the fever from entering their States;

Resolved, That in case it is proved that yellow fever is present in Florida, Boards of Health of adjoining States should establish and maintain a thorough system of so called inland quarantine, which means the inspection of travelers, the isolation of all infected persons and articles, and complete disinfection; these methods to be enforced with the least possible interference with travel and commerce, consistent with the protection of the public health.

The questions, "Powers which Provincial and State Boards should have over local Boards" (proposed by the Provincial Board of Quebec), and "What legal authority ought State Boards of Health to possess in the absence of local Boards?" (proposed by the State Board of Vermont), were then taken up.

On motion, Division (a) of the questions proposed by the State of California was included for discussion: "Cannot a plan be devised to insure uniformity and increase of power in State Boards of Health, by formulating in conference a draft of the extent of the increased powers desired in matters of quarantine, compulsory notification of contagious diseases, and other sanitary matters within each State, neglected or refused by local Boards, which formula may be expressed in a bill laid before each State Legislature for passage."

The discussion was opened by Dr. Orme, of California, who was of the opinion that a State Board should have complete authority. When the local organizations are in harmony with the State Board, then its duties would be chiefly advisory; but when a local organization, for any reason, refuses to act under the direction of the State Board, then the latter should compel it to act, or step in and do the work itself.

Dr. Hewitt said that in his State (Minnesota) the State and local Boards acted in harmony, the local organizations being under the control of the State Board. The control of infectious diseases of animals is in the hands of the State Board. Last year an epidemic of smallpox was suppressed in his State without the knowledge of the public press.

Dr. Baker held that the State Board should have no authority over local Boards. It should merely gather and distribute the facts.

The question proposed by the State Board of Michigan: "What is each State Board of Health doing to advance sanitary science—by the collection of statistics of deaths and their causes; by the collection of statistics of sickness; by the collection of statistics of meteorological conditions coincident with sickness and deaths?"

There was a lengthy discussion, participated in by all the members present, each delegate stating what had been done in his own State. It was the opinion of the majority of the delegates that there ought to be a law in every State of the Union requiring a certificate of death, giving the cause, and signed by some properly constituted officer, before the burial of any human body. The local health organizations should make regular reports to the State Boards; and, in addition, should report promptly every

case of contagious disease. This would not only secure to us better protection against such diseases as smallpox, scarlatina, diphtheria, and cholera, but would furnish our State Boards with the necessary data from which full and correct tables of vital statistics could be compiled.

Dr. Allen, of Vermont, read a paper on the question: "What sanitary regulations are necessary in and about country residences?"

He called particular attention to the small and poorly ventilated sleeping apartments and to defective drainage, whereby kitchen slops and privies were allowed to contaminate springs and wells.

Dr. Lindsley, of Tennessee, gave, by request, an account of his extensive experience with cholera. He said that the only thing necessary to prevent the spread of cholera was thorough isolation and disinfection. If this international epidemic is to be stopped in its ravages, we must look to our legislators at Washington. Isolation and disinfection is the watchword, but it takes money to secure this end.

The following resolution was introduced by Dr. Hewitt, of Minnesota, and after a lengthy discussion, was unanimously adopted:

Resolved, That a committee of nine be elected by this Conference by ballot, to visit or correspond with the State, Provincial, and other authorities having charge of the seaboard to quarantine against dangerous infectious diseases, for the purpose of learning the methods there in use, and the character and amount of coöperation such authorities can and will give for the best protection of the people of this continent against said diseases, and that said committee be authorized to act for this Conference for this purpose and be instructed to report the results of their investigation to this Conference and to the State Boards of Health, and to arrange for such coöperation between the health authorities of this country should any such diseases threaten to invade or actually get a foothold on this continent. Such committee to have full power to fill vacancies.

The following were elected members of the committee: J. H. Rauch, Illinois; H. B. Baker, Michigan; C. M. Hewitt, Minnesota; J. N. McCormack, Kentucky; James Simpson, California; John D. Jones, Ohio; P. H. Bryce, Ontario; Benjamin Lee, Pennsylvania; T. G. Simmons, South Carolina.

The election of this committee was by far the most important work of the Conference.

At the next session of the Conference, Dr. Lee read a valuable paper on the question: "What should be the attitude of State Boards of Health toward leprosy?"

He cited many cases to show that leprosy was contagious and should be subjected to the strictest quarantine.

Dr. Orme, of California, said that this was a question which intimately concerned the Pacific Coast. He gave the history of several cases in California, occurring amongst the Chinese, and stated that the State had endeavored to adopt the most careful precautions with regard to the admission of lepers.

Dr. Lee offered the following resolution, adapted from that of a committee of the State Medical Society of California:

Resolved, That it is the sense of this Conference—

Firstly—That a strict quarantine should be established against leprosy, and that all lepers attempting to enter this country should be returned to whence they came;

Secondly—That those already here, or who develop the disease here, should be rigidly segregated;

Thirdly—That it is eminently desirable that entirely distinct hospitals should be provided for such cases; and,

Fourthly—That the bodies of deceased lepers should be cremated or buried in lime and their personal effects be destroyed by fire, after being treated with powerful disinfectants.

The subject being an entirely new one to the Conference, was, on motion, referred to a special committee, to report at the next meeting of the Conference.

Unfinished business being in order, the report of the committee appointed to draft a constitution and set of by-laws for the Conference (Dr. L. F. Salomon, of Louisiana; Dr. H. B. Baker, of Michigan; Dr. J. D. Plunkett, of Tennessee, Committee), was then called for.

Dr. Baker reported the following plan, which, on motion, was unanimously adopted:

CONSTITUTION OF CONFERENCE OF STATE BOARDS OF HEALTH.

The name of this association shall be "The National Conference of the State Boards of Health."

Membership.—The members of this Conference shall be the executive officers or the delegated representatives of the State Boards of Health of the United States, and of the Provincial Boards of Health of the Dominion of Canada.

Dues.—Each Board represented shall pay to the Treasurer of the Conference \$5 per year.

Votes.—Whenever demanded by two delegates, any question shall be determined by a vote, each State being entitled to one vote.

Officers.—The officers of this Conference shall be a President, Secretary, and Treasurer. The duties of each officer shall be those which are usually performed by such officers, and collectively the officers shall be an executive committee to make suitable provision for meetings of the Conference, for programme, etc.

Parliamentary Rules.—Cushing's Manual shall be the guide to parliamentary action, in cases of question.

Amendment of this Constitution.—Notice of the nature of any proposed amendment of this constitution shall lie upon the table from one annual meeting to another before coming to a vote. Such notice having been given, this constitution may be amended at any regular meeting of the Conference, if the majority of States and Provinces represented vote in favor of such an amendment.

Dr. McCormack was reelected President, and Dr. Probst elected Secretary, and Dr. Baker, Treasurer for the ensuing year.

The time and place for the next meeting was left to the Committee of Arrangements, and after an announcement by Dr. Lee that the Health Board of Pennsylvania would assume the expense of publishing the proceedings, the Conference adjourned *sine die*.

Immediately after the adjournment of the Conference, the Committee on Quarantine met and organized by the election of Dr. J. H. Rauch, as Chairman, and J. N. McCormack, as Secretary.

The Chairman was instructed to write to the State Board of Health of New York, reciting the line of action agreed upon by the Conference in regard to quarantine inspections and interstate coöperation, and make inquiry as to how far we might expect the assistance and coöperation of that Board. The Chairman was also instructed to correspond with the Surgeon-General of the Marine Hospital Service, in order to ascertain what protection the quarantine administered by his service is able to furnish to the country against contagious diseases.

On motion, it was agreed that four sub-committees be appointed; the first to report as to the efficiency of the quarantine stations from the St. Lawrence to Baltimore; the second, from Baltimore to Galveston; the third, the Pacific Coast; the fourth, to arrange for coöperation between the various State Boards:

Sub-committees.—1. From the St. Lawrence to Baltimore—Dr. Lee, Dr. Baker, Dr. Bryce, Dr. Hewitt. 2. Baltimore to Galveston—Dr. Simmons, Dr. McCormack, Dr. Jones. 3. Pacific Coast—Dr. Simpson, Dr. Rauch, Dr. McCormack; Dr. Orme to coöperate. 4. Coöperation between the States—Dr. Baker, Dr. Hewitt, Dr. Simmons.

On motion, the Chairman was authorized to formulate the questions to be answered or investigated by the different sub-committees.

In the Section on State Medicine of the American Medical Association. Dr. Baker, of Michigan, Chairman of the Section, delivered the annual address on "Recent Advances in State Medicine." He pointed out that

a practical result of the work done by State Boards of Health in spreading knowledge among the people, was a decrease of mortality from preventable diseases.

The most important part of local, State, and National legislation on this subject related to the collection of facts. We should have statistics of sickness as well as of mortality, and much could be learned from a comparison of such figures with the records of temperature changes and atmospheric conditions.

Dr. Benjamin Lee read a paper entitled "Should not the National Government Defend Our Ports Against the National Enemy—Contagious Disease?"

He showed that, according to the Constitution, Congress had authority to assume control of maritime quarantine for the general welfare of the country.

During the past twenty years the assaults of foreign contagion have cost us more lives than were sacrificed in the great war immediately preceding that period; yet most of these lives might have been saved by the expenditure of a comparatively insignificant sum.

When quarantine was regulated by the local authorities, owing to the great expense all stations could not be of equal efficiency; but the weakness of one was a source of danger to the whole country.

In conclusion, he offered the following resolution, which was adopted:

Resolved. That the Section on State Medicine respectfully suggests to the American Medical Association the importance of formally urging upon the National Congress the duty of at once assuming entire control of the maritime quarantine, and of taking immediate measures to make such quarantine effective before the advent of hot weather.

At another meeting of the section, Dr. Lindsley, of Tennessee, read a very valuable and interesting paper urging the enactment of laws requiring the "Cremation of Garbage."

At a general session of the American Medical Association, Dr. Walcott, Chairman of the Massachusetts Board of Health, delivered the annual address on State Medicine. From the vital statistics of Massachusetts, he showed that since the establishment of the State Board of Health in 1869, the percentage of deaths from zymotic diseases had decreased from 25.6 to 19. The most marked reduction was in the case of smallpox, which is a disease absolutely preventable by vaccination and revaccination. To take an individual case: Since the establishment of a Municipal Board of Health in the City of Somerville, the death rate from all causes had decreased from 22.86 to 16.68 per one thousand.

Under the conditions of civilized life the individual is perfectly helpless to secure the physical basis of health. There is no help but in coöperation on the most extended scale possible—individual, municipal, State, and National. The individual must be compelled to give up the liberty to injure his neighbor; the city must be restrained from converting into a sewer the river which supplies water to the villages on its banks below; no State should permit its own causes of disease, whether persons or things, to be transported into another State; and lastly, the General Government should take cognizance of those causes of disease which can be controlled by no other power.

In conclusion, he urged the proper organization of some central health authority, whether in the form of a Bureau of Health, or a Board of Health, provided only that some of the great resources of the nation might be applied to the protection of that most valuable of all property, *human life*.

A resolution was adopted by the Association, urging upon Congress the necessity of the immediate passage of Senate Bill No. 2493—"To Perfect the Quarantine Service of the United States."



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ELEVENTH BIENNIAL REPORT

UNIV. OF MICHIGAN

SEP 2 1909

OF THE

STATE BOARD OF HEALTH

OF

CALIFORNIA,

FOR THE FISCAL YEARS FROM JUNE 30, 1888, TO JUNE 30, 1890.



SACRAMENTO:

STATE OFFICE, : : : : : J. D. YOUNG, SUPT. STATE PRINTING.
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MEMBERS OF THE CALIFORNIA STATE BOARD OF HEALTH.

President.

HENRY S. ORME, M.D. Los Angeles.

Secretary.

GERRARD G. TYRRELL, M.D. Sacramento.

W. R. CLUNESS, M.D. Sacramento.

R. BEVERLY COLE, M.D. San Francisco.

JAMES SIMPSON, M.D. San Francisco.

J. M. BRICELAND, M.D. Shasta.

C. A. RUGGLES, M.D. Stockton.

STANDING COMMITTEES OF THE STATE BOARD OF HEALTH.

1. *On the Salubrity of Public Institutions, Schools, Hospitals, Prisons, Factories, etc.*

DOCTORS COLE, ORME, AND SIMPSON.

2. *On Statistics relating to Life and Health, Modes of Employment and of Living, and the Comparative Healthfulness of different localities.*

DOCTORS CLUNESS, BRICELAND, AND TYRRELL.

3. *On Intoxicating Liquors, Inebriate Asylums, Pathological Influence of Alcohol, etc.*

DOCTORS SIMPSON, COLE, AND RUGGLES.

4. *On Influence of Irrigation, Tree Planting, etc.*

DOCTORS RUGGLES, ORME, AND CLUNESS.

On Legislative Business.

DOCTORS BRICELAND, ORME, AND TYRRELL.

On these Committees the Secretary of the Board is ex officio a member.

REPORT OF THE BOARD.

To his Excellency R. W. WATERMAN, Governor of the State of California:

In accordance with law, we herewith present the eleventh Biennial Report of the State Board of Health, and are pleased to congratulate the people of our Commonwealth upon the general good health which has prevailed during the past two years. California has experienced the common lot in a visitation of epidemic influenza in the early part of the present year, which led to considerable increase of mortality for several weeks, through pulmonary complications. An alarm of smallpox in May, 1890, in the Rio Grande region of New Mexico, justified us in sending out an Inspector, authorized to take the necessary measures to exclude the disease from the State. His report will be found in these pages, to show that the danger is not threatening during the warm season, but is liable to become imminent during the coming winter unless vigorous measures be taken meanwhile, through aid of the Federal Government.

We are gratified to know that the Government Quarantine Station, on Angel Island, Bay of San Francisco, is nearing completion, and is to be equipped with the most ample and improved appliances known in sanitation, whereby our State will be fully protected from foreign pestilence with the least possible interference with maritime traffic. This has been a great desideratum, and its establishment will give us security against cholera in any invasion from lands westward.

In view of the continued presence of leprosy in our State, the increasing number of white persons who become infected, and the absence of special hospitals for their isolation in any county, we beg to suggest the propriety, or perhaps necessity, of a State institution, to which they might be sent from all quarters within our borders. Each county might be required to contribute the necessary amount to defray the expenses of those sent out from its own territory, so that the State Treasury might be burdened only with the moderate cost of a suitable leper hospital, with accommodations for about twenty-five persons.

The appropriation of \$10,000, in 1887, for the use of the Board in excluding contagious disease from the State, has so far been more than sufficient, as only \$4,026 85 have been expended. We would recommend the further appropriation of \$10,000, subject to the same conditions as before, to meet any emergency that may arise.

With reference to other sanitary legislation, we are gratified to state that several important measures were enacted during the session of 1889. Section 3062, Penal Code, has been so amended that every unincorporated city or town, of five hundred or more inhabitants, must have a Health Officer; and a new section, 3064, provides for his compensation, and for his appointment by the State Board of Health, in case the county authorities neglect their duty in the case.

A new section, 3084, requires burial permits throughout the State, preceded and based upon a certificate of death from a physician, Coroner, or two reputable citizens.

Section 377, Penal Code, has been amended so as to provide penalties for violation of the law regulating burial permits, death certificates, and registration of deaths.

A new section, 400, makes it a misdemeanor to bring any diseased domestic animals into the State.

A law was enacted, requiring children throughout the State to be successfully vaccinated before admission to the public schools; and it is made the duty of the Trustees, or local School Boards, to provide for their vaccination. This law should be strictly enforced.

Another Act provides for the sanitary condition of factories, workshops, and mercantile establishments. Its execution is placed in the hands of the Commissioner of the Bureau of Labor Statistics, but he is not furnished with any additional officers or means to make the necessary inspections. The supervision of such matters properly belongs to the Health Department of cities and towns, and the law should be so amended as to provide for this.

A bill providing for a State Sanitary Inspector, to be chosen by the State Board of Health, and act under its orders, passed both the Senate and the Assembly just before the close of the session, but failed to obtain the Governor's approval. For several years the Board has felt the need of such an officer, to enable it to execute the functions imposed upon it, especially those enumerated in Section 2979 of the Political Code. The law forbids any compensation to the members, with the exception of the Secretary, whose province is mainly confined to the State capital; and the duties there defined will occupy the whole time of an expert sanitarian in visiting all parts of the State, inspecting public institutions, instituting and superintending a sanitary survey of the State, stimulating local authorities to *faithful execution of the laws* and to *hygienic improvements*, and in the *exclusion of contagious disease from the State*, whenever danger threatens its borders. Through such an agency the State Board can carry home its influence in full force to all public institutions subject to its supervision, to all local Boards of Health, and to the remotest communities. The State Board, therefore, regards its duty plain, to urge anew the necessary legislation for this object; and it confidently expects the Legislature and the Governor alike to favor a measure so promising of important benefits to the people of the State.

We would also recommend to your Excellency that the law organizing the State Board of Health be so amended as to provide a per diem of ten dollars for each member while engaged in the actual duties of the Board, as a slight compensation for the loss of time necessarily given in the service of the State.

Respectfully submitted.

H. S. ORME, M.D., President.
G. G. TYRRELL, M.D., Secretary.
W. R. CLUNESS, M.D.
JAMES SIMPSON, M.D.
R. BEVERLY COLE, M.D.
CHAS. A. RUGGLES, M.D.
J. M. BRICELAND, M.D.

ABSTRACT OF PROCEEDINGS

OF THE

QUARTERLY MEETINGS HELD DURING THE FORTIETH AND FORTY-FIRST FISCAL YEARS, ENDING JUNE 30, 1890.

SPECIAL MEETING, JULY 26, 1888.

A special meeting of the State Board of Health, convened at the request of his Excellency Governor Waterman, was held in the office of the Governor on Thursday, July 26, 1888, at 2 o'clock p. m. The Governor stated that the object of the meeting was for consultation with the Board as to their duty as an advisory Board to the State. The Governor stated that he believed that many of the institutions drawing aid from the State were in a bad sanitary condition; that the inmates were not receiving the aid to which, as wards of the State, they were entitled, and that he wished the State Board of Health to take the matter in hand, and to investigate the sanitary condition and administration of all public institutions drawing aid from the State and report their condition to him. He desired that every one doing business for the State should do it earnestly and fairly, and if those people in these different institutions were being wronged by their officers, or their sanitary welfare neglected, he desired the wrong righted, and he thought the State Board of Health the proper body to make an impartial report.

Dr. R. B. Cole desired to know of the Governor if it was his intention to have all the State institutions investigated, as it would take considerable time, and he must recollect that the State Board of Health received no compensation for their loss of time.

The Governor replied that the Board could choose its own time, but he certainly required all institutions drawing money from the State investigated, and all abuses, if any, corrected.

Dr. Orme said that although the State Board received no compensation, all its members were willing to do their whole duty in the premises, and would cheerfully aid the Governor in his efforts to maintain the healthful condition of all such institutions, and keep their administration free from injurious consequences likely to arise from unhygienic measures.

The Governor ordered the Secretary to furnish the Board with a list of all institutions drawing money from the State, both schools, asylums, hospitals, and reformatories, and requested the members of the Board to make some arrangement amongst themselves so that they might form sub-committees and visit these institutions. He mentioned some particularly which he wished reported upon early, and authorized the Board to employ a clerk if necessary, to note their proceedings during their official visits.

Dr. Simpson thought that he and Dr. Cole could report on the State institutions in and about San Francisco and Napa; Dr. Orme and Dr.

Ruggles could visit Stockton, and the other members could take the remaining places most convenient to them as they pleased.

After some further consultation on sanitary matters, and the earnest promise of the Governor to aid the Board in all matters appertaining to the health of the State, the meeting adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, July 26, 1888, at the usual hour.

Present—Dr. Orme, President; Drs. Tyrrell, Cluness, Briceland, Ruggles, Cole, and Simpson.

The minutes of the last meeting having been read and approved, Dr. Cole moved the following resolution:

Resolved, That in recognition of the efficient services rendered this State by our representatives in Congress, and Surgeon J. B. Hamilton, Surgeon General United States Marine Hospital Service, in securing the passage of our quarantine bill, this Board wishes to tender its sincerest thanks; and further be it

Resolved, That a copy of these resolutions, engrossed and signed by the President and Secretary of this Board, with official seal attached, be sent to each one of our representatives and Surgeon-General Hamilton.

Which was unanimously carried.

At the last meeting of our Board in San Francisco, it was agreed that a committee of two be appointed from this Board and two from the Board of Health in San Francisco, to consult together and agree upon what sanitary measures were needed to be presented at the next Legislature. Dr. Orme, in pursuance of that agreement, desired to appoint Dr. R. Beverly Cole and Dr. James Simpson, as our representatives in that Convention, and instructed the Secretary to notify the San Francisco Board of Health that such members, being residents of San Francisco, had been appointed in accordance with the resolution adopted April 16, 1888.

Dr. Orme presented his report as our delegate to the conference of State Boards of Health, which being very satisfactory to the members and confirmed their belief in the importance of having our Board represented, it was ordered that the report be published in the next Biennial Report of the State Board of Health.

The San Francisco City Board of Health having informed this Board of the occurrence of cholera in Hong Kong and its action in endeavoring to obtain authentic information from Surgeon-General Hamilton, who replied that no recent report had been received from Hong Kong, the following cable dispatch was transmitted soon after to this Board by Secretary Cyril Williams of the City Board of Health, San Francisco: "Cholera epidemic terminated July 9, 1888." However, the City Board of Health determined that all vessels arriving from Hong Kong with clean bills of health will be detained in quarantine three days, and passengers and effects fumigated.

On motion, the communications were received, placed on file, and the Secretary requested to continue in communication with the San Francisco Board, and request its Secretary to keep us informed of the progress of the disease, and the action taken by their Board, and that this Board

will at all times be ready to coöperate with their Board in preventing the invasion of this State by cholera.

Dr. James Simpson then introduced the following resolution:

Resolved, That this Board indorse and earnestly advise the passage of the bill now before Congress, known as House Bill No. 1,526, to establish a Bureau of Health, and that the Secretary is hereby instructed to send a copy of this resolution to our Senators and Representatives in Congress, with the request that they give it their support; and, further, that a copy of this resolution be forwarded to Hon. Robert T. Davis, of Massachusetts, the introducer of the bill.

Which was carried.

In view of the conference held to-day with Governor Waterman, Dr. R. Beverly Cole moved that the request of the Governor be now acted upon by the appointment of committees to report upon the sanitary condition and administration of the following particularly named institutions receiving State support:

Insane Asylum, Napa; San Francisco City and County Almshouse; Ladies' Relief Society, Oakland; Ladies' Relief Society, San Francisco; San Francisco Lying-in Hospital and Foundling Asylum; San Francisco Catholic and St. Joseph's Orphan Asylums; Sick Old Ladies' Home; San Francisco Female Hospital. Drs. Cole and Simpson were appointed a committee to investigate these institutions.

Stockton Insane Asylum; San Joaquin County Hospital; Los Angeles Orphans' Home; Los Angeles Orphan Asylum, Los Angeles. Drs. Orme and Ruggles were appointed as the committee to visit these institutions.

The Sacramento Orphan Asylum; St. Joseph's Orphan Asylum, Sacramento. Drs. Cluness and Tyrrell were appointed a committee to visit these places.

The Secretary was requested to furnish each member with a complete list of all institutions receiving aid from the State.

Dr. Simpson moved that the Secretary of this Board send the committees of this Board of Health copies of the law, section and article (repeating it), instructing them to examine into the sanitary condition and administration of the named institutions, signed by the President and attested by the Secretary, which was carried.

The Secretary then read a communication from the Clerk of Solano County in reference to the Selby Smelting Works, and asking the Board to have it, as a nuisance and prejudicial to health, removed or restrained from continuing its work.

On motion of Doctor Simpson, it was resolved that this Board, being merely an advisory body, had no power to take action in the matter complained of.

Dr. Orme read his report upon smallpox in Southern California for 1888, which was ordered published in the next Biennial Report of the Board.

Dr. Orme introduced the subject of the use of salt water for sprinkling purposes in cities, whether it was prejudicial to health or innocuous.

Dr. Simpson thought the subject one which required some deliberation, as sanitarians are not agreed upon its effects, and moved it be considered at some subsequent meeting, which was carried.

The question of cholera approaching our coast was next considered, and the opinion prevailed that we ought to make every preparation necessary for its reception, the probability of its coming here this summer being very great, and we cannot warn the people too soon to be on

their guard, and by perfect cleanliness to lessen the probabilities of its lodgment on the coast.

The question, What shall we do with our lepers, engaged the attention of the members in an animated discussion, in which all the members joined. The opinion generally concurred in was, that they should be disposed of as other sufferers from contagious disease, and isolated in some way during the period of their natural lives.

It was requested that any member of the Board who could find an authentic description of the cholera epidemic which raged along our coast in 1849-50-51, do so and present it to this Board.

There being no further business before the Board, the meeting adjourned.

GERRARD G. TYRRELL,
Secretary.

SPECIAL MEETING OF THE STATE BOARD OF HEALTH

Was held in San Francisco, September 29, 1888.

Present—Dr. Orme, President; Dr. Tyrrell, Dr. Simpson, Dr. Brice-land, Dr. Cluness, Dr. Ruggles. Dr. Cole was absent. Dr. Sawtelle, Dr. Barger, Dr. Herrick, City Board of Health; and Dr. Huse, Railroad Hospital service, were present by invitation.

The Secretary read a communication from the Governor, calling attention to the necessity of the Board's action in regard to yellow fever, as follows:

EXECUTIVE DEPARTMENT, STATE OF CALIFORNIA,
September 24, 1888. }

Dr. G. G. TYRRELL, Secretary State Board of Health, Sacramento:

DEAR SIR: In view of the fact that yellow fever is epidemic in several of the Southern States, and that its spreading is to be feared, and in order to guard and protect our own people against the invasion of so terrible a scourge, I desire that the State Board of Health shall bring every appliance to bear that may be considered necessary in order that its entrance into this State, either from the south or from the north, may be prevented whenever the power of the Board will permit; see that Inspectors are appointed, who thoroughly understand their duties, and will properly and honestly fulfill them; and should it be necessary to appoint or require the services of Inspectors in localities not within the limits of California, it would be advisable to consult the proper authorities at Washington regarding the matter. I do not desire to hamper you with any suggestions of my own, relying upon the intelligence and good judgment of the Board to carry out my views in the matter, requesting that I may be informed of the progress of events in connection with the subject now under consideration.

Yours truly,

R. W. WATERMAN,
Governor.

The Secretary also read the communication from Mr. J. H. Call, Los Angeles, addressed to Governor Waterman, as follows:

LOS ANGELES, CALIFORNIA, September 25, 1888.

To GOVERNOR WATERMAN:

DEAR SIR: I am informed that shipments of nursery stock are being made from Florida to this State, the particulars of which have been mentioned. We are liable to have yellow fever here any day, unless active and energetic steps are taken.

Yours truly,

J. H. CALL.

The Secretary reported that he had, in reply, telegraphed Mr. J. H. Call to see Dr. Orme and give him the particulars, and he would act at once to quarantine such shipments, which action, on motion, was approved.

Dr. W. R. Cluness thought it possible for the disease to reach California, and also believed that if it ever got into the State there were, at times, certain conditions which would permit its propagation, and thought if the germs were imported they would spread through the warm valleys of the State. He thought that every precaution possible ought to be taken to prevent its entry.

Dr. C. A. Ruggles concurred fully in all that Dr. Cluness had said, and thought the State should lose no time in putting itself on guard against it.

Dr. Simpson fully agreed with Drs. Cluness and Ruggles, that we ought to take action. The money was appropriated for just such purposes, and any blame for neglect of this duty would be severely visited upon the State Board of Health. He was of the opinion that if yellow fever once obtained an entrance into our State it would propagate, and finally be a difficult matter to eradicate it.

Dr. Briceland had lived in Texas, and in Galveston; the climate there is not dissimilar to ours. There it spread rapidly. Our population is constantly increasing and danger becoming greater, and believes with those that have preceded him, that if ever yellow fever gets a foothold in these warm valleys it will spread. He is certainly in favor of taking all the precautions possible, and doing it at once, by appointing Inspectors who are experts in the diagnosis of the disease.

Dr. Sawtelle, U. S. M. H. S., thought the conditions for the propagation of the disease present in California, and if once brought into the State would no doubt spread. He believed prevention possible by supervision of all incoming persons and goods.

Dr. Barger, Health Officer of San Francisco, agreed with all that had been said, and believed that the disease might get into the State through land travel, and that the State Board of Health would be held responsible if such an event occurred.

Dr. Huse thought that a report of the possibility of the entrance of yellow fever into our State would cause us great injury. The railroad company has now withdrawn its tickets via New Orleans. The railroad company hopes nothing will be done that would institute a panic. With a view to making the matter under discussion acceptable to the Board, he would accompany any gentleman appointed by the Board to the southern part of the State, and as far as El Paso, and make a thorough examination of the situation of things along the border, and he promised the coöperation of the railroad company in any action we may desire to take in the premises.

Dr. S. S. Herrick, Assistant Health Officer of San Francisco, thought that in this State we had temperature, susceptible people, sufficient humidity, and all the essentials needed for the propagation of the germs of yellow fever. In New Orleans they had the fever in 1878, although there was a severe frost at the time. He is convinced that if it once obtained a foothold in California it would be impossible to stamp it out; that, in fact, it cannot be stamped out, as, in truth, we know not in what the disease consists.

Dr. Huse remarked that now the railroad line along the Mississippi Valley was open to traffic and no danger was apprehended to travelers thereon.

Dr. Simpson thought it would be prudent to send an Inspector into

El Paso and elsewhere to find out where the disease was, so that we might take such steps to avoid it as seemed best.

The motion of Dr. C. A. Ruggles, that to prevent the possibility of the entrance of infectious diseases into this State, this Board appoint a competent Medical Inspector, at a salary of \$250 a month, and his necessary expenses upon presenting proper vouchers therefor, which was seconded by Dr. Cluness, was unanimously carried.

On motion of Dr. Tyrrell, Dr. S. S. Herrick of San Francisco was nominated as one fully conversant with yellow fever, an authority on inland quarantine, and in every way desirable for the position.

Seconded by Drs. Simpson and Briceland. He was unanimously elected, and requested to enter upon his duties at once.

A telegram was received from Governor Waterman:

SACRAMENTO, CAL., September 29, 1888.

Dr. G. G. TYRRELL, *etc.*:

Report says two carloads of negroes en route from Georgia. Quarantine them somewhere, sure. I will be in Sacramento to-night.

R. W. WATERMAN,
Governor.

The Secretary was instructed to answer the dispatch asking where the negroes were, and by what route they were coming, and the State Board would take action promptly.

On motion of Dr. Simpson, the President and Secretary were requested to call upon Mr. Towne, General Superintendent of S. P. R. R. Co., and ascertain what precautions they are taking regarding freight and passengers from districts infected with yellow fever, to prevent its introduction into the State; which, after some discussion, was carried.

There being no further special business before the Board, on motion, the meeting adjourned.

GERRARD G. TYRRELL,
Secretary.

THE REGULAR MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, October 13, 1888, at the usual hour.

Present—Dr. Orme, President; Dr. Tyrrell, Dr. Cluness, Dr. Briceland, Dr. Cole, and Dr. C. A. Ruggles.

The minutes of last regular meeting having been read and approved, the minutes of the special meeting were read and approved.

The Secretary called the attention of the Board to a communication from the National Association of General Baggage Agents, embodying the following rules, and asking the action of the Board upon them, as follows:

1. The transportation of bodies of persons dead of smallpox, Asiatic cholera, typhus fever, or yellow fever, is absolutely forbidden.

2. The bodies of those who have died of diphtheria, scarlet fever, typhoid fever, erysipelas, measles, and other contagious, infectious, or communicable diseases, must be wrapped in a sheet thoroughly saturated with a strong solution of chloride of zinc in the proportion of one half pound of zinc to one gallon of water; or a strong solution of not less than 2 per cent strength of bichloride of mercury, and inclosed in an air-tight zinc, copper, or lead-lined coffin, or in an air-tight iron casket, and all inclosed in a strong, tight wooden box. The coffin, or casket, must also be surrounded, in space between coffin and outside box, with sawdust saturated with a solution of chloride of zinc, or chloride of mercury of the same strength as above.

3. In case of contagious, infectious, or communicable disease, the body must not be accompanied by persons who, or articles which have been exposed to the infection of the disease. And in addition to the permit of the Board of Health, agents will require an affidavit from the shipping undertaker stating how the body has been prepared and the kind of coffin or casket used, which must be in conformity with Rule 2, and that the Health Officer of the locality to which the body is consigned has consented to the proposed shipment and has had such timely notice of the hour of its arrival within its jurisdiction as will enable him to supervise its reception.

The bodies of persons dead of diseases that are not contagious, infectious, or communicable, may be received for transportation to local points in same State when incased in a sound coffin, or metallic case, and inclosed in a strong wooden box, securely fastened so that it may be safely handled. But when it is proposed to transport them out of the same State, or to another State, they must be incased in a zinc, copper, or lead-lined coffin, which is air-tight, or in an air-tight iron casket. If any other kind of coffin is used the body must be properly embalmed.

5. Every dead body must be accompanied by a person in charge, who must be provided with a ticket for himself, and also present a full first class ticket marked "corpse," and a permit from the Board of Health giving permission for removal, and showing name of disease, cause of death, and whether of a contagious or infectious nature.

6. The permit of the Board of Health must be issued in duplicate, the original to accompany body to destination; the duplicate will be retained by agent at initial point, and sent to the General Baggage Agent.

7. It is intended no dead body shall be removed which may be the means of spreading disease; therefore, all disinterred bodies dead from any disease or cause will be treated as infectious, and dangerous to public health, and will not be received for transportation unless said removal has been approved by the State Board of Health, and the consent of the Health Officer of the locality to which the body is consigned has first been obtained.

In submitting these rules for your consideration it is not assured that they are now perfect, and we are simply asking your approval of them; on the contrary, we solicit any suggestions or recommendations which, in your opinion, will be to the interests of the public health, and at the same time not unnecessarily burdensome and expensive to the public.

It is a noticeable fact that infectious or communicable diseases follow more quickly the lines of communication, being spread by the movements of the people; and as the railroads are the principal medium of communication among the people, the trunk lines spanning the continent, and bringing to our door the inhabitants of all parts of the country, it is patent to all that local rules, be they ever so stringent, can afford but partial protection, and as the bodies of the dead are transported in the same cars and among the baggage containing the wearing apparel of the passengers, the need of some effective rule which will apply the law in Pennsylvania as in Colorado is the more apparent. Cannot this be accomplished, and may we have your coöperation to that end?

In looking over the above rules, the following inquiries are suggested: Is it policy to have a list of specified dangerous diseases that will not be carried, as in Rule 1, and should this list stand or be extended? Answer—Yes, stand; no extension.

There being a difference of opinion among Health Officers as to danger in transporting bodies dead of certain disease, should we not take the safe side in case of doubt, as in first part of Rule 2? Answer—Yes.

Will the rule of preparing bodies for shipment be effective, or should there also be an injection of fluid into the cavities. Answer—Yes.

What would be the extra expense of thus preparing dead bodies? Answer—We do not know.

What should be the additional expense of ordinary air-tight zinc, copper, lead-lined, or iron caskets, or caskets compared with ordinary coffins, or caskets that are not claimed to be air tight? Answer—The question of expense in this matter is a very serious one, and of course must not be overlooked.

Will this scheme be prohibitory in the case of people of ordinary or limited means? Answer—We do not know.

Is there any standard by which undertakers are graded to ascertain whether competent or not; are they examined by a Board of Examiners before being allowed to practice the art of embalming, as are physicians before practicing their profession? Answer—None in this State.

If not, what assurance have the public of any safety, even though a certain undertaker made oath that he had prepared a body for shipment in accordance to these rules? Answer—None.

Should not each State require undertakers to take out a license, and pass an examination before a competent Board of Examiners, before he is allowed to ship a dead body out of that State? Answer—Yes.

Is there any penalty in your State for making false affidavit, or issuing false certificate, either as to cause of death or as to the preparation of the body for transportation; and, if not, should there not be some legislation which will give the necessary protection? Answer—Yes.

Who, in your opinion, should look after the matter? Answer—Local Board of Health. Is it not desirable that all permits for the removal of dead bodies be issued by the Boards of Health; and cannot this be done in all cases, even in small towns or country districts? Answer—Yes.

Is it not desirable that a nearly uniform style of removal permits be used, to insure definite and necessary information, to enable persons to transport dead bodies through several States, without danger of being stopped at some intermediate point? Please send samples of permits used in your territory. Answer—Yes.

To enable the committee to prepare their report, we would request that all communications on the subject be sent to the Secretary, at Detroit, Mich., on or before December first.

H. P. DEARING,
J. C. LENIX,
F. A. ZIMMERMAN,
Sub-Committee.

J. E. QUIRK,
Secretary.

On motion, the above answers were given as the conclusions of the Board upon the subject-matter, and the Secretary was instructed to transmit the same to the Secretary of the Baggage Masters Association.

A communication was received from Irving A. Watson calling attention to the publication of a new work upon "Disinfection and Disinfectants," and suggested the purchase of a sufficient number of copies for the use of the members of the Board.

After some discussion, on motion of Dr. Cole, the Secretary was instructed to order eight copies of the same for use of members of the Board, inclusive of one copy for the library of the Board.

The Secretary read the draft of an Act appointing a Sanitary Inspector for the State in general, together with some points in defining his duties. After some discussion as to the propriety of asking the Legislature to add such amendment to our health laws, it was, on motion of Dr. Ruggles, referred to the Committee on Legislation without recommendation.

The Secretary informed the Board that he had telegraphed to Dr. C. A. E. Hertel, of Gonzales, inquiring into the truth of the death of fourteen children from malignant sore throat, the result of eating the meat of diseased cattle, and read Dr. Hertel's reply, informing the Board that the children died in 1884, and not in 1887, as had been stated, and also gave a detailed account of the prevalence of Texas fever and anthrax in Gonzales, and the habit of the Spanish population to salt, pepper, and dry the meat of the dead animals and eat it, but denied they exported it, although one peddler in Gonzales had done so, sending the meat to Salinas. The communication was placed on file for future reference.

Dr. Orme requested the Secretary to read a letter received by Dr. Bowhill, a veterinarian in San Francisco, from a Mr. Wender, of San José, describing the appearance of a diseased cow and calf in Lick market, and also the fatality of Texas fever in Salinas Valley. The letter was read and placed on file.

The report on specimen from Sargents confirmed the diagnosis of splenic apoplexy by Dr. Spencer.

The Secretary also read a letter from J. H. Logan of Santa Cruz describing a case of actinomycosis in a cow in his possession, which was ordered placed on file, having been replied to by the Secretary.

Dr. R. B. Cole, in reference to the presence of Texas fever, anthrax, and actinomycosis, desired to read the Act organizing the State Board of Health, and defining its powers, to ascertain if the Board had any legal authority to act in the premises. He thought we had sufficient evidence of the presence of a disease among cattle which was contagious and infectious, and dangerous to human life, to warrant us in acting

under Section 2979 of the Civil Code, which orders us to take cognizance of the interest of health and life among the citizens generally, "and if we recognize that the public health is now jeopardized, we must act in this relation." Never before in the history of this Board has a question of such vital importance been presented before it for its action. Not only are the lives of our citizens threatened, but it even extends to our progeny, who may have their constitutions ruined by inherited disease. We must attack this disease at its very foundation, but how to get at it effectively he was not prepared to say. Referring to Mr. Mercer's report, who, being a Government agent, and experienced in cattle disease, we cannot doubt the presence of splenic fever on the coast, and although it has not yet been demonstrated that the disease is transmitted to the human family through diseased meat, we know that anthrax has been, likewise actinomycosis. We must take some action to suppress it. He would therefore move that this Board place itself in communication with every local Board of Health in the State, and with Boards of Supervisors or Trustees, and call their attention to the existence of these diseases, and their influence upon public health, and request them to immediately take such steps as in their judgment seem best to determine their existence within their several jurisdictions, and suppress the same. And this Board further suggests that all animals affected by these diseases be killed and cremated; and further, that the surface of the field or range upon which they have fed or traveled over be burned for the purpose of destroying the germs of the disease.

Motion seconded by Drs. Briceland and Ruggles.

Being called upon, Dr. Ruggles hardly knew how to bring what he had to say into line; however, in an interview he had with R. Sargent, to ascertain the facts regarding the southern country, Mr. Sargent was reticent, but referred him to Mr. Miller, a cattle man extensively engaged in the cattle industry. Mr. Miller acknowledged that a man by the name of Breen had lost nine hundred cattle out of one thousand two hundred, but denied that the mortality was due to Texas fever. He said the cattle had been almost starved, and when brought into a rich pasturage had eaten so much that they died of repletion.

Dr. Ruggles believed that the investigation of this disease was going to create quite a disturbance among the cattle men, and was not willing to do anything hastily, but after mature consideration and consultation, we ought to be prepared to do something to check the evil which now so seriously threatens the welfare of our State.

Dr. Orme remarked that he had had a consultation with a gentleman who said that he brought a herd of sixty head from Texas, and after they had been on his pasture a short time, many of them died, but moving them on high ground, the mortality ceased and they became fat and well.

Dr. Briceland was glad to see the discussion assuming a character which would bring out the scientific aspect, as twenty-five years ago little or nothing was known of Texas fever or cattle plague. He remembered, in his experience, that when bringing cattle across the plains from Texas, they would appear to be fat and well; he remarked, however, that when gathering other cattle, the other cattle would get sick and die. This was so constantly observed that the passage of Texas cattle through the Indian nations territory gave rise to much sickness and death among

their herds, as to be the cause of war with the nations. No one then knew what the mysterious sickness was, whether it was something indigenous to Texas, or acquired by travel. We were indeed glad that science had come to the front to explain it, and thought that the Board should take prompt and active measures to suppress it if possible, as it undoubtedly menaced the lives and welfare of our citizens.

Dr. Orme said that when at the conference of State Boards of Health he inquired of several Boards if they took cognizance of diseases among cattle as part of the work of their Board. He found that many of them did, and had laws passed appointing Veterinary Surgeons under control of the Board. Michigan and Minnesota had such laws, and so had several other States, the names of which just then escaped his memory. He thought that if we had our laws so amended as to compel the formation of local Boards, we would be in a much better condition, through a more perfect organization, to combat these diseases, and suppress them wherever they appeared.

Dr. R. B. Cole desired to offer a motion, and said that, in view of the exigencies that had at this time arisen, we believe that, as a Board, we are called upon to take immediate and decisive action; therefore, it is moved, "That a competent veterinary surgeon be appointed, who shall visit the southern portions of this State where the cattle diseases are said to exist; ascertain the facts as to their existence through personal inspection and investigation, and where the disease is discovered that he be instructed to recommend to the Supervisors of each county to have such cattle killed and their carcasses burned, and also to have their place of pasturage destroyed by fire, so far as practicable, to destroy the disease germs." Seconded by Dr. Briceland.

Dr. Ruggles opposed the motion as it now reads, as we had already instructed the Secretary to communicate with the Supervisors to do the very thing we now were going to appoint a veterinary surgeon to do. For his part, he was sure the Supervisors of San Joaquin County would do their duty. They had a competent veterinary surgeon there, who could attend to their county, and did not relish the State officials looking after their local affairs.

Dr. Cole was glad Dr. Ruggles had offered his objections, the force of which he now saw, and would therefore beg leave to amend his motion that it should apply only to those counties which do not take action within sixty days after notification by the Secretary, which was unanimously carried.

The Secretary read a communication from Dr. S. S. Herrick, Medical Inspector, who stated that after diligent investigation, he learned that the negroes reported from Georgia had come from North Carolina by way of Omaha, and had not been near the yellow fever districts. He also learned that no nursery trees had been shipped from Florida, and would not be until February or March, after the frosts; but these shipments would be carefully watched, and if any danger was likely to arise, would be quarantined. He stated that he would visit Guaymas, and personally ascertain if any yellow fever existed in that quarter. He would also visit Tucson, where it was said smallpox was prevailing. At present his headquarters were at Yuma, where he was making preparations to have all passengers inspected.

On motion, the letter was placed on file.

Dr. Ruggles, one of the committee to report the "sanitary condition and administration of institutions drawing State aid," read his report.

Dr. Cole, also on committee, asked further leave to report on the institutions he was to visit, which was granted.

Dr. Tyrrell, with Dr. Cluness, also on a committee, presented their report on institutions visited.

On motion, the various reports were received, and ordered printed in the Biennial Report for service of the Governor.

Dr. Cole moved a special meeting be called by the President whenever he deems it necessary to act upon the resolution appointing a Veterinary Surgeon for the counties which neglect or refuse to act according to the spirit of the resolution. Carried.

The Secretary read a communication from Dr. Hill, offering his services as Inspector at San Pedro, which, on motion, was placed on file.

The report from the American Consul at Guaymas was read. He claimed no sickness there. It was ordered on file.

There being no further business the meeting adjourned.

GERRARD G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, January 5, 1889.

Present—Dr. Orme, President; Dr. Tyrrell, Secretary; Dr. Ruggles, Dr. Cole, Dr. Simpson, Dr. Briceland, and later, Dr. Cluness.

The minutes having been read and approved, the Secretary reported that in accordance with instructions given last meeting, he had drawn up and distributed to the several Supervisors throughout the State the following:

To the ———:

GENTLEMEN: At a meeting of the State Board of Health held in Sacramento, October 13, 1888, it was—

"Resolved, That this Board place itself in communication with every local Board of Health or Board of Supervisors in the State, and call their attention to the existence of contagious and infectious diseases among the cattle in California, and their influence upon public health, and request them to immediately take such steps as in their judgment seem best to determine the existence of such disease within their respective jurisdictions, and suppress the same. And this Board further suggests that all animals affected by these diseases be killed and their carcasses burned; and further, that the surface of the fields or ranges upon which they have fed or traveled, be burned for the purpose of destroying, as far as possible, the germs of disease."

In accordance with the above resolution your attention is hereby called to this matter, and it is hoped that such immediate action will be taken as to promptly arrest the spread of Texas fever, anthrax, actinomycosis, or kindred cattle diseases, and thus prevent the dangers of infection and contagion to which the public is exposed so long as the diseased animal exists. The meat is not fit for human or animal food, and contact with the dead animal may so inoculate any one dressing the carcass that death will rapidly take place, or the system be so impaired by the absorption of the poison that perfect recovery seldom occurs.

H. S. ORME, M.D.,
President.

G. G. TYRRELL, M.D.,
Secretary.

The Secretary read his report on his visit to Merced to examine into an epidemic of smallpox reported there. He also reported a visit made

by Dr. Ruggles to the same town two weeks previous, when he discovered that smallpox existed.

The Secretary then called attention to the claim of the American Public Health Association for \$5, which, on motion, was ordered paid.

Dr. Simpson presented his certificate of reappointment, which was received and placed on file until the reappointment was confirmed by the Senate.

The Secretary then read a communication from the Board of Health of Oakland, regarding cattle disease and the action of the Supervisors ordering all cattle inspected, which, when read, was ordered placed on file.

The Secretary then presented the report of Dr. Thos. Bowhill, upon the cattle disease discovered by him in the southern counties, which was received and placed on file for future reference.

The Secretary read a communication from Dr. Joseph Holt, late of New Orleans, relative to the position of Commissioners of Health in the new Bureau of Health about to be organized by the United States Government, which was received and placed on file for future action.

Dr. James Simpson presented the following report of a joint meeting of the committees appointed by this Board and that of San Francisco, which is herewith appended:

SAN FRANCISCO, January 3, 1889.

At a joint meeting of the legislative committees of the State and City Boards of Health, held at the office of Dr. R. Beverly Cole at 8 p. m., there were present Doctors R. B. Cole and Jas. Simpson, of the State Board, and Perry and Clinton of the City Board, Dr. Cole acting as Chairman. Dr. S. S. Herrick, present by invitation, was requested to act as Secretary.

Dr. Cole first read an article from the January number of the "Pacific Medical and Surgical Journal," upon sanitary legislation, and calling attention to the following subjects as appropriate for consideration, in view of the approaching session of the State Legislature: The more effectual registration of vital statistics; vaccination as a condition of admission to public schools; medical certificates of death and burial permits as prerequisites to interment; notification of cases of contagious or infectious diseases to the health authorities throughout the State; the segregation of lepers; the appointment by the State Board of Health, and provision by the Legislature for the pay, of a State Analyst, a State Sanitary Inspector, and a State Veterinarian; a per diem allowance to the members whilst in active service; the creation and maintenance of local Boards of Health in all the towns and counties of the State.

On motion of Dr. Clinton, it was unanimously agreed to recommend the necessary legislation for the appointment by the State Board of Health of a State Sanitary Inspector and a State Veterinarian, their duties to be defined by the Board, with provision for salary of \$3,000 per annum to the former and \$2,000 to the latter, together with actual and necessary traveling expenses.

Dr. Perry read an extract from the law organizing the State Board of Health of Illinois, showing that that State Board is vested with ample powers in sanitary matters throughout the State. On his motion it was resolved that it is desirable for the California State Board of Health to be empowered to exercise authority in all sanitary matters throughout the State with the exception of quarantine.

On motion of Dr. Simpson, it was resolved that the State Board of Health be authorized to empower local Boards of Health to appoint such sanitary officers as may be deemed necessary, and fix their salaries, said salaries to be paid out of the general fund of each city or county employing such officers.

Dr. Clinton then called attention to a number of desirable changes in the Political Code in order to render more efficient its provision for the sanitary service of the city of San Francisco.

Some discussion was had upon these points, but it was found impracticable at this meeting to bring the subject into shape suitable for precise recommendation. It was agreed that the committee of the City Board of Health should frame a bill to embody their wants, and that the State Board should aid in its passage.

The joint session of the two committees then adjourned.

S. S. HERRICK,
Secretary.

The report was received, and on motion adopted, and the bill accompanying it as modified was ordered presented to the Legislature:

AN ACT

To amend the Political Code by adding two sections to the same, providing for the appointment of a State Sanitary Inspector and a State Veterinarian.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Two new sections are hereby added to the Political Code, to be known as 2984 and 2985.

Section 2984. The State Board of Health must appoint a regular physician in good standing, and of recognized sanitary qualifications, who shall be known as the State Sanitary Inspector, and who must perform such duties as said Board may require. An annual salary of three thousand dollars, together with actual and necessary traveling expenses incurred in the performance of his duties, must be paid to him in the same manner as salaries of State officers are paid.

Section 2985. The State Board of Health must also appoint a suitably qualified man, who shall be known as the State Veterinarian, and who must perform such duties as the Board may require. An annual salary of two thousand dollars, together with actual and necessary traveling expenses incurred in the performance of his duties, must be paid to him in the same manner as salaries of State officers are paid.

Sec. 2. This Act shall be effective from and after its passage.

A communication was read from Dr. G. A. Kober, of Fort Bidwell, asking the indorsement of our Board to a proposition to publish a work upon the topography, botany, climate, and diseases of California, from the standpoint of a sanitarian, and intended for the medical profession.

Dr. R. Beverly Cole moved that it is the sense of this Board that such a work as contemplated by Dr. Kober is very desirable, and will be likely to exert a healthful influence in the interest of this State, and that this Board not only lends its influence, in the matter of furnishing statistical material, but also, as requested by Dr. Kober, will furnish him letters of introduction to our Senators and Representatives in Congress; which, seconded by Dr. Simpson, was, on motion, unanimously carried.

Dr. Orme suggested that the bills already drawn to amend the health laws of the State be presented to the Legislature at as early a day as possible. Carried.

Dr. J. R. Laine presented his commission from the Governor as a member of the Board, and demanded his seat.

Dr. Tyrrell protested that, under the law, there was no vacancy to be filled until Dr. Laine's appointment had the consent of the Senate; accordingly, he was not recognized as a member of the Board, and could not be until such confirmation by the Senate was obtained.

There being no further business, on motion, the meeting adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, April 13, 1889.

Present—Dr. H. S. Orme, President; G. G. Tyrrell, Secretary; Dr. J. M. Briceland, Dr. W. R. Cluness, Dr. C. A. Ruggles, members, and Hon. E. W. Maslin by invitation. Letters from Dr. R. Beverly Cole and Dr. Jas. Simpson, explaining the impossibility of their being present, were read and accepted.

The Secretary read a communication from the Board of Health of Georgetown, requesting a visit from the Secretary, to examine and report upon the sanitary condition of Georgetown, and assign some reason, if possible, for the frequency of disease in that town. In compliance with

that request, your Secretary paid an official visit to the town, March 26, 1889, and desires to present to the Board his report.

On motion, the report was read, and ordered spread upon the minutes, as follows:

In company with Mr. C. A. Fitzgerald, Secretary of the Board, and the members of the Board of Health of Georgetown, an examination was made of a certain swamp or slough running in front of the principal street of the town, and parallel with it. This slough or swamp was all the way from twenty to a hundred or more feet wide, covered with rank vegetation. Throughout its length it contained pools of stagnant water, in which algae and decomposing animal and vegetable matter were present. In warm weather the odor from these pools was noted for its great offensiveness. In the center of the slough was a small stream of running water, which was fed by rivulets issuing laterally from the rising ground on either side, and partly from a reservoir at the head of the slough, by seepage through its embankment. Upon one side of this slough was a Chinese settlement. Here were a number of small ponds used by the Chinese for irrigating their vegetable gardens, back of their tenements. Upon visiting these houses the filth observed was simply horrible. In each house was a large earthen jar, into which was conducted by a tin spout all the urine excreted by the inhabitants, whether residents or visitors. As the large jars inspected were half full of stale urine, the collection of some weeks, the odor of decomposition reached the nostrils long before the receptacles were seen. This urine is carefully preserved until the jar was full, when it was emptied into a receiving tank full of human excrement, which had been systematically collected in open boxes placed beneath the seating-plank in each privy. When these in their turn were full, urine and feces were mixed together in sufficient dilution to spray over the growing vegetables.

The stench arising at these times was unbearable, and was continually wafted over the town on the opposite side by the prevailing wind. In one house, or cabin, the operation of hog killing was carried on. This den fairly reeked with blood and offal, which was carefully hoarded in stinking heaps for future use in the gardens. A filthier or more disgusting settlement could hardly be conceived to exist in a civilized country.

Above these Chinese quarters was the reservoir, a large body of storage water, which was kept fresh by a stream of water conveyed to it through the large flume of the water company. Evidently some seepage came through the embankment of this reservoir and found lodgment in the slough at its base. To the left of this reservoir, but outside the town proper, was another large reservoir into which the ditch company's flume emptied, and was received at its opposite side into another flume, which conveyed the water down the mountain side for miners' use. This water was constantly changing and never stagnant.

Pursuing our way down the town, we noticed that the drinking water in use by the population was all obtained through sunken wells, their average depth being about forty feet. In close proximity to these, in nearly every instance, was the privy vault, used for years without cleaning—the custom being that when filled to overflowing another hole was sunk alongside and the privy house moved over it. In one instance the privy was moved over the well, and a new well sunk close by. In the principal hotel, the well was sunk not eighty feet from the privies, which were situated on the side of a hill, just above the well. How this well could possibly escape pollution is beyond conception. Back of this hotel and on another street above was a slaughter house, situated close to a ravine which ended in a fish pond. This slaughter house had been partially cleaned, but the earth about it was saturated with blood and offal, which upon a warm day was said to be particularly offensive. The ravine leading to the fish pond was made the receptacle for garbage from the town—decayed vegetable matter, old rags, boots, tin cans, and filth of every description. Considering all these sources of pollution, both to the air and the water, we had no difficulty in explaining the sources of disease to the stricken inhabitants. We therefore, at a meeting of the Health Board, explained to it that we believed their malarial diseases came from the slough and Chinese quarters in front of the town, and their typhoid and other diseases from their drinking water and filthy premises—their slops being invariably thrown either back or front of their dwellings, to fester and decay under their very noses. We advised, therefore, that a deep drainage channel be cut through the slough, not less than four feet on top and at least three feet deep, and, if possible, to carry the water down the ravine through a vitrified pipe, or at least in a well graded drain, properly trenched. We also advised the Board to declare Chinatown a nuisance and have it removed, its ponds filled up, and to permit no more ordure to be collected, except when properly deodorized and disinfected. We also advised the removal of the slaughter house from its present site, the ravine cleaned out, the fish pond abolished, and no more garbage be permitted to be thrown into the ravine. We also advised the abolition of the privy vaults, and the substitution thereof of earth closets; the cleaning of all wells, and the boiling of the water before drinking. It was also advised that an ordinance be passed forbidding the pollution of the ground with house slops; that properly cemented vaults be built some distance from the dwellings, and into these the house slops be conveyed by earthen pipes, properly trapped. We believe that with these sanitary reforms the usual healthy condition of the inhabitants would, after a little time, be restored, and that paludal and filth fevers would cease to exist. The Board thanked us very warmly for our visit and promised to have our advice strictly followed, and would then report the result.

On motion, the action of the Secretary was indorsed and approved.

The proximity of dug wells to privies was discussed, and the effect upon the water commented upon. It was concluded that the water of dug wells was dangerous as a beverage from surface drainage alone, and recommended that all such water needed boiling to render it safe. Dr. C. A. Ruggles explained that in Stockton, where the drinking water is all taken from wells, the wells are cased, the borings passing through a thick stratum of blue clay, which is impervious to surface water. When the blue clay is passed through, the auger passes into a stratum of gravel and sand, through which the water percolates, at a depth of a hundred or more feet. The water is perfectly pure and sweet, and being protected by the iron pipe through which it passes, it cannot become polluted by seepage or surface water. To the very purity of this water and its general use, Dr. Ruggles attributes the remarkable healthfulness of the inhabitants of Stockton, the rarity of typhoid fever, and the low death rate. He believed that all drinking water ought to be taken from a great depth, and through cased wells, when such source is possible. Where surface contamination and the soil will permit of privy percolation into a dug well, the water cannot be fit for domestic use, except it is first boiled.

Dr. Cluness remarked that the water of the Sacramento River, although it looked muddy, and was muddy, it was good drinking water when it was filtered and boiled. For his own family use he had the water filtered and then boiled, and he knew of no better water for general use than the Sacramento River water when thus treated.

Dr. Orme said that the water of Los Angeles was not of the very best, and he had no doubt would be improved if it was boiled before using.

The Secretary read a communication from General McComb, Warden of the State Prison at San Quentin, relative to the removal of dead bodies prior to the statute limitations for such removal. The District Attorney of Marin County having given his opinion that such could be done, General McComb, following this opinion, had consented to the resurrection of a body one month after burial.

On motion of Dr. Cluness, seconded by Dr. C. A. Ruggles, the Secretary was requested to obtain from the Attorney-General a written opinion upon the legality of removing dead bodies under two years' burial, as now laid down by the Code in the Act of 1878, page 1,050. It was so ordered.

The Secretary reported that the Legislature, at the request of the State Board of Health, passed the following bills which had received the Governor's approval:

AN ACT

To encourage and provide for a general vaccination in the State of California.

[Approved February 20, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Trustees of the several common school districts in this State, and Boards of common school government in the several cities and towns, are directed to exclude from the benefits of the common schools therein any child or any person who has not been vaccinated, until such time when said child or person shall be successfully vaccinated; *provided*, that any practicing and licensed physician may certify that the child or person has used due diligence, and cannot be vaccinated so as to produce a successful vaccination, whereupon such child or person shall be excepted from the operation of this Act.

SEC. 2. The Trustees or local Boards, annually, or at such special times to be stated by

the State Board of Health, must give at least ten days' notice, by posting a notice in two or more public or conspicuous places within their jurisdiction, that provision has been made for the vaccination of any child of suitable age who may desire to attend the common schools, and whose parents or guardians are pecuniarily or otherwise unable to procure vaccination for such child.

Sec. 3. The said Trustees or Board must, within sixty days after the passage of this Act, and every year thereafter, ascertain the number of children or persons in their respective school districts or subdivision of the city school government being of an age suitable to attend common schools, who have not been already vaccinated, and make a list of the names of all such children or persons. It also shall be the duty of said Trustees or Board to provide, for the vaccination of all such children or persons in their respective school districts, a good and reliable vaccine virus wherewith to vaccinate such children or persons who have not been vaccinated. And when so vaccinated to give a certificate of vaccination, which certificate shall be evidence thereof for the purpose of complying with section one.

Sec. 4. The necessary expenses incurred by the provisions of this Act shall be paid out of the common school moneys apportioned to the district, city, or town. And if there be not sufficient money, the Trustees must notify the Board of Supervisors of the amount of money necessary, and the Board must, at the time of levying the county tax, levy a tax upon the taxable property in the district sufficient to raise the amount needed. The rate of taxation is ascertained by deducting fifteen per cent for delinquencies from the assessment, and the rate must be based upon the remainder. The tax so levied must be computed and entered upon the assessment roll by the County Auditor, and collected at the same time and in the same manner as State and county taxes, and when collected shall be paid into the county treasury for the use of the district.

Sec. 5. The Trustees of the several school districts of this State are hereby required to include in their annual report, and report to the Secretary of the State Board of Health, the number in their several districts between the ages of five and seventeen years who are vaccinated, and the number unvaccinated.

Sec. 6. This Act shall take effect immediately.

After some discussion as to the enforcement of this law at the present time, Dr. C. A. Ruggles thought that perhaps we might wait for an epidemic, as then the law might be universally complied with.

Dr. W. R. Cluness did not agree with Dr. Ruggles, but thought that we ought to order a general vaccination this fall, and have every person protected from smallpox as soon as practicable.

Dr. Ruggles agreed upon this proposition, and proposed to renew the subject at the meeting in October.

The Secretary reported that the following bill had received the Governor's approval:

AN ACT

To amend section three thousand and eighty-four of an Act entitled an Act to establish a Political Code, approved March 12, 1872, relative to the interment or cremation of human bodies.

[Approved February 25, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and eighty-four of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, is hereby amended so as to read as follows:

Section 3084. No person shall inter, cremate, or otherwise dispose of any human body, in any city, county, or city and county, without having first obtained a permit therefor. In incorporated cities, or counties, or cities and counties, the permit must be obtained from the person authorized to grant the same by any law, ordinance, or resolution passed for that purpose. But in the absence of such law, ordinance, or resolution, the permit must be obtained from either the Coroner, or Health Officer, Board of Health, or if the Coroner be absent, then from the Health Officer or Board of Health; and if there be no Board of Health or Health Officer, then from a Justice of the Peace. The person applying for a permit must produce and file with the officer issuing the permit, a certificate signed by a physician, or a Coroner, or two reputable citizens, setting forth as near as possible the name, age, color, place of birth, occupation, date, locality, and cause of death of deceased. And no permit shall be granted without the production of such certificate. Such permit must be filed with the County Recorder, and the person so filing is entitled to the compensation provided for in section three thousand and seventy-seven of this Code; but if any other registration of the death of the deceased shall have been made, the Recorder must record the name but once.

Sec. 2. This Act takes effect thirty days after its passage.

In addition to this law, the Secretary reported the following amendment to the Penal Code, which provides for the punishment of those who fail to keep the law relative to interments and the public health:

AN ACT

To amend section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February 14, 1878, relating to the disposal of human dead bodies, and preservation of the public health.

[Approved February 25, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February fourteenth, eighteen hundred and seventy-two, is amended so as to read as follows:

Section 377. Every person who is charged with a duty relating to the registration of deaths, under chapter three, title seven, of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, who

1. Willfully fails to keep a registry of the name, age, residence, and time of death of a decedent; or,

2. Willfully fails to register with the County Recorder a certified copy of such register, as is provided for in said chapter; or,

3. Willfully inter, cremates, or otherwise disposes of any human body, in any city, county, or city and county, without having first obtained a permit, as provided for in said chapter; or,

4. Willfully grants a permit for the interment, cremation, or disposition of a dead human body, without the certificate provided for in said chapter; or,

5. Willfully violates any of the laws of this State relating to the preservation of the public health;

Is guilty of a misdemeanor, and is, unless a different punishment for such violation is prescribed by this Code, punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding one thousand dollars, or by both such fine and imprisonment.

The law relating to the establishment of Boards of Health also received the approval of the Governor. Unfortunately it was printed containing a typographical error, "eighty-seven" being printed instead of "eighty-nine." This may make the enforcement of the law a matter of some difficulty, if any community is foolish enough to resist it. The error was noticed in time, and referred back to the Assembly, where we were assured it was corrected. Through some neglect of the proper officers, it was again overlooked, and the bill printed with the original mistake uncorrected, as follows:

AN ACT

To amend section three thousand and sixty-two of, and to add a new section to, an Act entitled "An Act to establish a Political Code," approved March twelfth, eighteen hundred and seventy-two, relating to Boards of Health.

[Approved March 1, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and sixty-two of said Act to establish a Political Code is amended so as to read as follows:

Section 3062. The Board of Supervisors of each county must appoint, in each unincorporated city or town of five hundred or more inhabitants, a Health Officer, who has all the duties and powers of the Board of Health and Health Officer, as specified in this and the two preceding articles.

SEC. 2. There is added to said Code a new section, to be called section three thousand and sixty-four, which shall read as follows:

Section 3064. The Board of Supervisors must fix the salary or compensation of Boards of Health or Health Officers, and provide for the expense of enforcing the provisions of this article. If the Board of Supervisors or Board of Trustees, Council, or other corresponding Board of any incorporated town, neglects to provide a Board of Health or Health Officer by the first day of July, eighteen hundred and eighty-seven, the State Board of Health may direct the District Attorney of the county to begin an action against such Board of Supervisors, or Board of Trustees, or corresponding Board, to compel the performance of their duty, or may appoint a Board of Health, or Health Officer with the powers of a Board of Health, for such town or city, and the expenses of

such Board of Health or Health Officer shall be a charge against the incorporated city or town for which such appointment shall be made; and when the appointment is made for unincorporated towns the expenses of the Board of Health or Health Officer is a charge against the county.

On motion, it was resolved that the Secretary be instructed to issue a circular letter to the Supervisors, Trustees, or Councilors of the different counties, advising them of these laws, and printing the same for their instruction, and requesting them to act at once upon their provisions. Carried.

The Secretary reported that owing to the expenses of the State Board for the fortieth fiscal year exceeding its appropriation, he had a deficiency bill passed as follows, which will carry the Board through until June, 1889:

AN ACT

Making an appropriation for the deficiency in the appropriation for the necessary expenses of the State Board of Health for the fortieth fiscal year.

[Approved March 7, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The sum of five hundred dollars is hereby appropriated out of any money in the State Treasury not otherwise appropriated, for the payment of the deficiency in the appropriation for the necessary expenses of the State Board of Health for the fortieth fiscal year.

SEC. 2. This Act shall take effect immediately.

In order that this deficiency may be avoided in the forty-first and forty-second fiscal years, your Secretary had the regular appropriation of the Board increased \$500, so that now our Board is in receipt of all the income permitted by the law organizing the Board. If our work extends, as it must do as the State becomes more populous, it will be necessary to have our funds increased. A law regulating quarantine, and the admission of horses, cattle, sheep, and swine into the State of California from infected districts, was passed and received the Governor's approval. Subsequent examination, however, discovered the fact that the law had never passed the Assembly in due form. Doubt being expressed upon its legality, it was, on motion, resolved that action on it be postponed at present.

The credentials of applicants for the position of Quarantine Officer under the bill were not considered, from the above cause intervening.

On motion of Dr. Cluness, it was resolved that we adjourn, to meet in Dr. Simpson's office, in San Francisco, at 8 o'clock on Tuesday evening next.

On motion, the meeting adjourned.

G. G. TYRRELL,
Secretary.

ADJOURNED MEETING OF THE STATE BOARD OF HEALTH

Was held in San Francisco, April 16, 1889.

Present—Dr. Orme, President; Dr. Tyrrell, Secretary; Dr. J. M. Brice-land, Dr. C. A. Ruggles, Dr. W. R. Cluness, Dr. Jas. Simpson, and Dr. R. Beverly Cole. Dr. Barger, Health Officer of San Francisco, and Dr. S. S. Herrick, Assistant Secretary, were also present by invitation.

The minutes of the last meeting having been read and approved, Dr.

Cluness observed that the law requiring general vaccination of all children attending the public schools was mandatory in its provisions, requiring to be put in operation in sixty days after its passage. He therefore thought we ought to take action in accordance with law.

Dr. R. Beverly Cole therefore moved that whatever action this Board has taken in deferring the institution of general vaccination of school children immediately be rescinded. This being seconded by Dr. Cluness, was carried.

Dr. Cluness then moved that the Secretary be instructed to notify the different authorities whose duty it is to carry out the provisions of the law, to take immediate steps to do so.

The Secretary was also instructed to have published the law relating to the punishment for neglect to obey the health laws of the State.

Dr. S. S. Herrick said that the chief duty of a Sanitary Inspector, the bill for the creation of which was refused signature by the Governor, would have been to see personally that the sanitary laws were obeyed throughout the State, as it would be a matter of impossibility for the Secretary of the Board to attend to this duty, in addition to the clerical work indispensable in connection with his office. Had the Governor signed this bill, instead of allowing it to repose in his pocket, it would have made a great difference in the sanitary welfare of the State, and have been the means of unifying the local Boards everywhere with the State Board.

The question of quarantine was next introduced for discussion.

Dr. R. Beverly Cole stated that he had lately received a letter from Surgeon Sawtelle, U. S. M. H. S., in which he informed Dr. Cole that the plans were now being drawn for the erection of a suitable building on the grounds selected by the Commission at Angels Cove; that a disinfecting steamer had been ordered, and that every modern appliance would be instituted for the purpose of facilitating the discharge of passengers, and the rapid disinfection of cargoes and ships.

The Board felt satisfied that progress had been reported, as it was anxious before the dangerous season arrived that means of prevention would be provided at the earliest possible moment by the Government.

The question of leprosy was now discussed, Dr. Barger reporting some cases now in the pesthouse.

Dr. H. S. Orme reported that he was now preparing a paper upon leprosy for our next Biennial Report, and for that purpose asked Dr. Barger to have some negatives and photographs taken of those patients in the Twenty-sixth-Street Hospital. The cost of these negatives would be \$14. Dr. Orme did not know whether their cost would come under the legitimate expenses of the Board or not. Upon discussion of this subject, the members unanimously agreed that as the plates were for the use of the Board, the bill should be paid by it.

It was therefore moved and seconded that the Secretary be authorized to pay the bill on its presentation.

On motion, the meeting then adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary on July 11, 1889.

Present—Dr. H. S. Orme, President; Dr. Tyrrell, Secretary; Dr. J. M. Briceland, Dr. W. R. Cluness, and Dr. C. A. Ruggles.

The minutes of the last meeting were read and approved.

The Secretary read a communication from Hon. Marcus D. Boruck, Private Secretary to the Governor, addressed to the Board of Health, and calling its attention to a telegram from Governor Waterman, reporting the shipping of cattle, consisting of two thousand head, to this State, and affected with Texas fever.

On motion of Dr. Cluness, the letter was received and placed on file.

The Secretary reported that he had received a communication from Dr. Thos. Bowhill, veterinary surgeon, relative to the presence of anthrax in a dairy near San José. Upon receipt of this report the Secretary addressed a letter to the Mayor of San José, advising him of the fact, and requesting the organization of a Board of Health, to take action to protect the public against diseased milk that might come from this dairy.

On motion of Dr. Ruggles, the communication of Dr. Bowhill was placed on file, and the action of the Secretary approved.

A communication was read from Dr. Prevost, of San José, advising that a Board of Health had been organized in San José, and a Health Officer appointed.

The Secretary read a communication from Dr. S. S. Herrick, of San Francisco, relative to the prevention of contagious diseases in cattle, and suggesting that precautions be taken immediately in the way of burning the stubble upon which such cattle grazed, and having all cattle dying of such disease cremated.

On motion, the letter was placed on file, and the Secretary requested to communicate with Dr. Salmon, of the Bureau of Animal Industry, and inform him of the presence of splenic apoplexy in the Santa Clara Valley, and to request him to take such means as may come within his province, to arrest the spread of the disease, and to destroy the diseased cattle; which was carried.

On motion of Dr. W. R. Cluness, the Secretary was instructed to communicate with the Supervisors of the Santa Clara Valley, and notify them that splenic fever exists in their country, and request them to take some action in the matter if they have not already done so; which was carried.

The Secretary then read the opinion of the Attorney-General upon the question of exhuming human bodies before the two years had expired, which was designated by law as the earliest time in which such exhumation could take place.

On motion of Dr. Briceland, the letter of the Attorney-General was received and placed on file for future action.

The Secretary then read several letters from County Recorders, Boards of Health, etc., requesting information regarding burial permits, death certificates, and registration blanks.

On motion of Dr. C. A. Ruggles, it was—

Resolved, That the Secretary be authorized to design and have printed sufficient burial permits and death certificates to supply all Health Officers and others in need of such certificates to carry out the law relating to deaths in this State, and also, when necessary, to supply blanks for marriages and births as required by sanitary officers.

Carried unanimously.

The subject-matter of river pollution having been introduced it was, on motion—

Resolved, That it having come to the knowledge of this Board that it is contemplated to divert the sewage of certain towns bordering upon the Sacramento River into said stream, it is the sense of this Board that such diversion of sewage will be prejudicial to the public health, and should not be permitted under any circumstances.

Which was carried.

It was moved by Dr. Briceland, and seconded by Dr. Cluness, that Dr. Ruggles be requested to ascertain the wishes of Governor Waterman in regard to an official visit by the members of the State Board of Health to the various institutions drawing State aid this year. Carried.

On motion of Dr. Cluness, the Secretary was instructed to renew the subscriptions of the State Board to the *Annals of Hygiene*. Carried.

It being the sense of the Board that the State of California should be represented at the next meeting of Conference of State Boards of Health, it was moved that Dr. C. A. Ruggles be appointed our delegate to represent this Board at the Conference of State Boards of Health. Carried.

After a general discussion upon matters of sanitary interest, there being no further special business, on motion, the meeting adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, October 12, 1889.

Present—Dr. Orme, President; Dr. Tyrrell, Secretary; Dr. J. M. Briceland, and Dr. C. A. Ruggles. Dr. Cluness was unable to be present, owing to illness, and Drs. R. Beverly Cole and James Simpson were absent from the State.

The minutes of the last meeting having been read, and on motion approved, Dr. Ruggles desired to relate his experience in relation to the opinion of the Attorney-General concerning the exhumation of bodies before the time stated in the Political Code. He said that a body that had died in Stockton Insane Asylum was buried, but shortly afterward the relatives of the deceased desired to remove it to San Francisco. As the death occurred outside the city of Stockton, Dr. Ruggles, in accordance with the expressed opinion of the Attorney-General, gave a permit for the removal of the body, although only a short time buried. This action was not acceptable to the authorities in San Francisco, and they wrote a letter to Dr. Ruggles protesting against his action, to which Dr. Ruggles replied, citing his authority.

The question brought before the Board was now fully discussed, and upon motion the course pursued by Dr. Ruggles was indorsed.

Dr. Ruggles reported, in regard to the visiting of institutions receiving State aid, that after an interview with the Governor's Secretary the Governor wrote him a letter asking him to visit those institutions supported by the State, and make his report regarding their sanitary condition. Dr. Ruggles stated that in accordance with the Governor's instructions he had visited these institutions, and would make a detailed report hereafter.

On motion of Dr. J. M. Briceland, the action of Dr. Ruggles was approved, and his expenses ordered paid.

The Secretary read the following letter from Dr. D. E. Salmon, in reply to the request of the Board that he take some action to guard against the spread of Texas fever in our southern counties:

U. S. DEPARTMENT OF AGRICULTURE, BUREAU OF ANIMAL INDUSTRY,
WASHINGTON, D. C., July 24, 1889.

SIR: Referring to your favor of the thirteenth instant, in which you notify me of the request made by your Board that this department send a competent Inspector to Santa Clara Valley to prevent the spread of splenic fever, I would say that this department has no authority to enforce measures for such a purpose within your State. I see no way by which the losses from this disease can be prevented except by a State law, which would prevent the movement of cattle from the infected districts during the month of the year when they are liable to carry the contagion. After the season is advanced, and the cattle have been moved, the pastures are infected, and it is impossible to adopt any measures which will prevent the disease. Regulations should go into force early in the season, probably as early as February, in that climate.

Very respectfully,

D. E. SALMON,
Chief of Bureau.

On motion of Dr. Briceland, the letter was received and placed on file.

The Secretary read a communication from Dr. Lathrop, of San Pedro, asking the Board for the appointment of a Quarantine Officer, or, if he had the power, to appoint himself.

On motion, the Secretary was instructed to write to Dr. Lathrop, and give him the opinion of the Board that such appointment lay with the Board of Supervisors.

The Secretary read a number of letters from different District Attorneys regarding the operation of the health laws, which, on motion, were placed on file.

The Secretary read a communication from Dr. Dodson, of Red Bluff, regarding the dumping of sewage into the Sacramento River, which was discussed and placed on file for further action, if deemed advisable.

In regard to the question of emptying the sewage of Redding into the Sacramento River, the Secretary reported that he had addressed the following letter to Jerry Culverhouse, Mayor of Redding:

SACRAMENTO, July 27, 1889.

DEAR SIR: I am instructed by the State Board of Health to inquire whether it is or is not a fact, that it is the intention of the authorities at Redding to convey the sewage of that town into the Sacramento River, and thus pollute its waters to the detriment of the public health. If such should be the case, it will become the duty of the State Board of Health to enjoin any such action as prejudicial to the welfare and best interests of the State. An answer will oblige,

Yours respectfully,

GERRARD G. TYRRELL,
Secretary.

In response to this document, the following letter was received:

REDDING, CAL., August 1, 1889.

Mr. G. G. TYRRELL:

DEAR SIR: On my arrival home from the city, found your letter of the twenty-seventh, asking if it were the intention of the authorities of Redding to sewer to the Sacramento River. In reply, I will say to you the City Council will meet the first Monday in August, then I will place your letter of inquiry before that meeting for their consideration, and inform you of the result.

Respectfully yours,

JERRY CULVERHOUSE,
Mayor of Redding.

The Secretary reported that since the receipt of that letter no communication as to the action of the Redding Trustees had been received.

Dr. Briceland was happy to say that since the action of this Board was understood, the city of Redding had abandoned the idea of putting its sewage into the river, and had made arrangements for utilizing it upon a sewage farm.

The Secretary read a communication from F. T. Newberry, civil engineer, suggesting that before any town or city disposes of its sewage, the plans of the same be submitted to the State Board of Health for its approval, especially regarding the outfall, the condition of the mass of sewage in which it is to be left, and how it will affect other citizens.

On motion, the communication was received and placed on file.

Dr. C. A. Ruggles presented a communication and opinion from the District Attorney of San Joaquin, defining a nuisance, and including in it the discharging of sewage into streams used for potable purposes; which, on motion of Dr. Briceland, was received and ordered spread upon the minutes, as follows:

In reference to the alleged public nuisance referred to me, I submit as follows:

"A public nuisance is one which affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be equal. (Civil Code, Section 8480.) Anything that is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, as unlawfully obstructing the free passage or use in the customary manner of any navigable lake, or river, bay, stream, canal, or basin, or any public park, square, street, or highway, is a nuisance. (Civil Code, Section 479; Penal Code, Section 370.)

"That which is or will create a nuisance is a question of fact, and one can only draw a conclusion upon that state of facts which do exist, or if they did exist, a conclusion upon what would be the result.

"If the state of facts do exist, and the sewage of any city or town is turned into a public stream, and as a conclusion from the facts, and result of such, it should impair the health of the individuals along said stream, or should make the waters therein indecent or offensive by its pollution, or interfere with the comfortable enjoyment of life or property along said stream, it would undoubtedly be a public nuisance.

"Yet if, on the other hand, the water of said stream is unused for any purpose, and the stream is wide enough and deep enough to carry said sewage without noticeable effect as to health, and does not interfere with the comfortable enjoyment of life and property, it is not a public nuisance within the meaning of the statute, providing it does not obstruct the navigation of said stream. Therefore, in conclusion, I would say that the facts as they exist can only be known through an investigation which the Board of Health are presumed to make, and if such a state of facts exist as would in this instance come under the provisions of the Code named, no one but a physician would be better able to draw the conclusions, and which, not desirous to take from the duties and authority of the District Attorney of the county where such instances may exist, yet always being ready to assist a public officer in the discharge of his duty, I respectfully submit the above."

(Signed:)

AVERY WHITE,
District Attorney, San Joaquin County.

Dr. C. A. Ruggles moved that a committee of three be appointed to investigate the source of any pollution that may be conveyed into our rivers used for domestic purposes, and said committee shall require of all incorporated cities and towns to furnish plans or plan of their sewage disposal for the use and publication of the State Board of Health; which was carried unanimously.

The President appointed as such committee Dr. Briceland, Dr. Ruggles, and Dr. Tyrrell.

Dr. Ruggles asked leave to present the following resolution:

WHEREAS, Having officially inspected the sanitary condition of the State Prisons at San Quentin and Folsom, and being satisfied that a certain class of criminals among those suffering from pulmonary disease are injuriously affected by confinement in San Quentin; therefore, be it

Resolved, That a circular be issued by the State Board of Health to the Superior Judges of each county of the State, requesting them that, before sentencing a criminal to the State Prison, an examination be made by the County Physician regarding the physical condition of the prisoner, and if any pulmonary disease be present or likely to develop, that such prisoner be sentenced to Folsom Prison instead of to San Quentin.

Which was seconded by Dr. Briceland.

At the request of Dr. Ruggles the consideration of the resolution was postponed until the next regular quarterly meeting of the Board.

Dr. H. S. Orme stated that he had visited San Francisco for the purpose of investigating cases of leprosy in that city. He had discovered that two cases had been imported from New York in the persons of two Chinamen. Another case came from Napa. He reported progress with his report upon the subject of leprosy, for publication in the next Biennial Report.

There being no further business to come before the meeting, upon motion, it adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, January 11, 1890.

Present—Dr. H. S. Orme, President; Dr. G. G. Tyrrell, Secretary; Dr. C. A. Ruggles, Dr. W. R. Cluness, and Dr. B. Payton, of Stockton, by invitation.

The Secretary read a communication from Dr. J. M. Briceland, of Shasta, regretting his unavoidable absence, owing to severe illness.

Dr. James Simpson, of San Francisco, also sent his regrets at his absence, which was also owing to illness, from which he had not sufficiently recovered to warrant his presence.

The minutes of the last meeting having been read and approved, the Committee on Investigating the Sewerage of Towns reported that owing to the severity of the weather since last meeting, they did not deem it expedient to visit those towns at present, and asked an extension of time, which was unanimously granted.

The resolution offered by Dr. Ruggles at the last meeting of the Board now came before it for action.

Dr. Ruggles explained the reasons for his resolution and described his impressions of the State Prison at Folsom, and was surprised at the healthy condition of the inmates and the general absence of sickness among them. When visiting San Quentin, Dr. Ruggles was not so surprised, owing to the situation of the prison, to see so many cases of consumption, as he believed the climatic influences there had a great deal to do with it. In this view he was sustained by the Resident Physician, Dr. F. C. Durant, who agreed with Dr. Ruggles that the situation developed tuberculosis in those predisposed to it. Dr. Ruggles then explained why he desired his resolution to lie over until this meeting, being desirous of hearing the opinion of those members of the Board who reside in San Francisco.

Dr. W. R. Cluness was of the opinion that the frequency of tubercular diseases in the prison might be attributed more to the age of the prison than to its climatic surroundings. He believed that disease germs

had permeated the cells throughout, and never having been thoroughly disinfected, new occupants were more prone to become infected. As he was a firm believer in the contagious nature of consumption, he thought this fact was sufficient to account for its frequency. Folsom Prison, on the contrary, was a comparatively new prison, and had not the same opportunity offered by age to become infected. He would, therefore, offer an amendment to Dr. Ruggles' motion: "That all cells containing, or having contained, tuberculous patients be properly disinfected, and the surgeon of the prison be requested to have disinfected all such contaminated cells."

Dr. Cluness, in offering the amendment, did so from the belief that climatic influences was not so potent a factor in the production of phthisis as would appear from Dr. Ruggles' resolution, but would agree to Dr. Ruggles' resolution if that clause in reference to climate were omitted and the disinfection of cells be agreed upon. Dr. Ruggles would accept the amendment, as his object was to have those prisoners afflicted with tubercular diseases removed to a more suitable climate for pulmonary ailments, and fully agreed with Dr. Cluness in the necessity of having cells disinfected that are, or might have been, occupied by consumptive persons. Therefore, the resolution, as amended, reads as follows:

WHEREAS, Having officially inspected the sanitary condition of the State Prisons at San Quentin and Folsom, and being satisfied that a certain class of criminals among those suffering from pulmonary disease are injuriously affected by confinement in San Quentin; therefore, be it

Resolved, That a circular be issued by the State Board of Health to the Superior Judges of each county of the State, requesting them that before sentencing a criminal to the State Prison, an examination be had by the County Physician regarding the physical condition of the prisoner, and if any pulmonary disease be present or likely to develop, that such prisoner be sentenced to Folsom Prison instead of to San Quentin, and that the surgeon of the prison be requested to have disinfected thoroughly all cells occupied by consumptive prisoners, and such cells as have been occupied by tuberculous patients at any time.

Dr. Cluness seconded the resolution, which was then carried unanimously.

The Secretary read a communication from Dr. Mitchell, of Redding, presenting an ordinance passed by its Board of Health, ordering the display of signal flags on houses containing infectious disease.

Dr. Ruggles moved that this action of the Board of Health of Redding be approved, and that this Board would be pleased to see all towns and cities taking like precautions to resist the spread of infectious disease; which was carried.

The Secretary read a communication from Health Officer Dr. Lathrop, of San Pedro, which was ordered placed on file.

Dr. H. S. Orme reported that he was preparing his report on leprosy, and was making progress. He, in connection with the subject, begged leave to offer the following resolutions:

WHEREAS, The Iowa State Board of Health has deemed it proper to adopt resolutions petitioning Congress on account of the importation of leprosy into that State; therefore, be it

Resolved, That the California State Board of Health recommend that the Congress of the United States do enact a statute,

First—That no person affected with leprosy should be permitted to enter the United States.

Second—That every person immigrating to the United States from any place where leprosy prevails shall procure a certificate from a competent physician, properly attested by some United States Consul or Health Officer, certifying that he or she is not affected with leprosy, is not a descendant from a leprosy family, and has no relations in the co-lateral line who are lepers.

Third—That every immigrant coming to the United States who has sojourned or resided where leprosy prevails shall be reported to the Board of Health of the State of his destination, so that he may, during his residence in the United States, be inspected not less than twice each year by some competent physician or person appointed by the health authorities of the place wherein he resides, for a period of ten years.

Fourth—That the penalty for the violation of the first two sections of this statute shall be the immediate return of such person to the place whence he or she came.

Resolved—That the California representatives in Congress be and they are hereby earnestly requested to vote for the enactment of such a statute, and that the Secretary of this Board be instructed to furnish said Congressmen a copy of these resolutions, duly signed by the President and attested by the Secretary.

Dr. Cluness thought this to be a most important subject, and begged to second the resolutions, which were carried unanimously.

There being no further business before the Board, the meeting, on motion, adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, April 12, 1890.

Present—Dr. R. Beverly Cole, Dr. James Simpson, Dr. C. A. Ruggles, Dr. J. M. Briceland, and Dr. G. G. Tyrrell. Absent—Dr. H. S. Orme and Dr. W. R. Cluness.

A telegram was read by the Secretary from President Dr. H. S. Orme, regretting his unavoidable absence, owing to illness.

Dr. Ruggles thereupon moved that Dr. R. Beverly Cole take the chair in absence of President Orme, which was seconded by Dr. J. M. Briceland, and unanimously carried.

The minutes having been read and approved, the Secretary read a communication from the Superior Judge of San Benito County, which, on motion, was received and placed on file.

A communication from Hon. Thos. J. Clunie was also read and placed on file.

A communication from the District Attorney of Napa County was received and placed on file, and the recommendation therein acted upon, the Secretary being instructed to issue a circular as suggested.

A communication was read from Surgeon Hamilton, U. S. M. H. S., in reply to inquiries made by the Board as to the progress of the quarantine stations at San Francisco and San Diego, which was received and ordered placed on file, and the Secretary requested to correspond with Surgeon Hamilton, asking his views as to what methods or means would be suggested by him to enable this Board to aid him in carrying out the ideas expressed in his letter.

Dr. Simpson moved, which was seconded by Dr. Briceland, that the Secretary be requested to have a pamphlet published, containing all the State laws relating to health, and also, under a separate heading, the health ordinances existing in each county, town, or city in the State, for the guidance and instruction of Boards of Health and Health Officers. Unanimously carried.

A communication was received from Dr. H. S. Orme, inclosing a correspondence relating to lepers, which was read and ordered placed on file.

A circular from the National Conference of State Boards of Health was received, requesting our Board to name a delegate or delegates to the Conference, and to choose a subject for discussion at the meeting.

Dr. J. M. Briceland moved, and it was seconded by Dr. James Simpson, that Dr. C. A. Ruggles be appointed as delegate to the National Conference to represent this Board, and that the subject chosen for discussion be: "How to prevent the contamination of potable water." Unanimously carried.

It was also—

Resolved, That it is the sense of the California State Board of Health, that for the better promotion of sanitary sciences in these United States, the meetings of the Conference of State Boards of Health be amalgamated with the meetings of the American Public Health Association, as part of said association. The cost of attendance upon both meetings, as now ordered, being a burden which distant States are unable to meet, owing to the lack of funds placed at their disposal for such contingencies; and be it further

Resolved, That our delegate be instructed to advocate and support such resolution before the Conference.

Which was unanimously carried.

There being no further business before the meeting, on motion, it adjourned.

GERRARD G. TYRRELL,
Secretary.

REPORT OF PERMANENT SECRETARY.

To the State Board of Health:

GENTLEMEN: The period has arrived when it becomes the duty of your Secretary to present for your consideration his Biennial Report, now the eleventh in the series. Since the organization of the Board in 1870, its progress in the sanitary improvement of the State has been slow, and beset by many difficulties. A review of the work accomplished in the past few years will encourage us in the belief that a new era has dawned upon our Board, and the desire of the public for increased knowledge in the means of remedying the defects in the sanitary administration of the State has increased in a manner heretofore unrecognized. There seems to be a general awakening to the importance and necessity of sanitary measures if we would retain the prestige of the State as one of the most healthy in the Union; we are becoming convinced that we cannot do so if we allow our potable waters to be polluted, our air poisoned by the emanations of accumulated filth, and our food adulterated by the conscienceless dealer. As a result of the protestations of our Board, we find the Legislature coming to our aid in giving us laws to compel the organization of Boards of Health everywhere within the State. Through these our Board is endeavoring to establish a system of sanitary communication, and by them to be forewarned of any epidemic diseases that may exist in their respective communities, of all dangers that may threaten the purity of our potable waters or the healthfulness of our food supply. But with all this help we are still far away from anything like perfection. As Lord Derby says: "No sanitary improvement worth the name will be effective, whatever Acts you pass, or whatever powers you confer upon public officers, unless you create an intelligent interest in the matter among the people at large." To do this has been the chief aim of your Board for some years, and we believe that to a certain extent we are succeeding, by publishing every month a record of the number of deaths reported to us, giving the causes thereof, and commenting upon the extent of the diseases, their location, together with some sanitary advice or comment in every number; this has engendered an interest in health news, so that we find the daily press cooperating in our work by giving a large circulation to the sanitary facts therein enunciated.

This education of the people through the press is now bearing fruit, and the difficulty experienced heretofore in getting people to look after the sanitary welfare of their towns and dwelling places is fast disappearing. Hardly a day passes that your Secretary has not been consulted as to the best means to be adopted to have such and such a nuisance removed, or such and such a water supply protected from contamination, or asking that our Board order a Health Officer appointed for such and such a district, or complaining that so and so was neglecting his duty as a Health Officer. All this indicates an awakening of public sentiment, and a growing belief that sanitation is essential to health and longevity, and that in the State Board of Health a way will be found through

which people may be surrounded by an atmosphere of cleanliness and healthfulness, and lives may be, if not positively prolonged, at least rendered happier by the absence of preventable diseases. To realize fully the benefit to be derived from the operations of a State Board of Health, it should be clothed with mandatory power. The State Board of Health of Illinois, for example, has charge of all matters pertaining to quarantine; in times of epidemic it has full authority to prevent invasion of disease by closing the portals of admission to the State.

It can at its discretion put railroad and steamboat traffic under its control; it can at all times make such rules and regulations and undertake such sanitary investigations as it may from time to time deem necessary for the preservation or improvement of public health; it can command the services of all police officers, Sheriffs, Constables, and all other officers and employes of the State, to enforce such rules and regulations, so far as the efficiency and success of the Board may depend upon their official coöperation. Our Board, unfortunately, is clothed with no such strength; it is not empowered by its own act to oppose any barrier to the progress of infectious or contagious diseases in any direction. All executive authority is placed in local Boards of Health, and they are responsible for the sanitary condition of their respective towns. Each local Board may enact its own sanitary regulations, which, after approval of the Trustees, Council, or Supervisors, and published in a prescribed method, have the authority and effect of law. The power and authority to act to bring about results and accomplish sanitary reforms, rests in the town Board of Health. The State Board of Health has no authority to enforce sanitary reforms; its functions as a conservator of public health are those of an advisor and counselor. It is the highest authority in the State upon the principles of sanitary science as applied to State medicine. It is the source from which the people, public officials, and local Boards of Health may seek for information on questions of public hygiene. Its duties are not executive, but rather those of a teacher, and also of a learner; for in its charter is specified that "it shall take cognizance of the interests of health and life among the citizens; it must make sanitary investigations and inquiries respecting the causes of disease, especially epidemics, the source of mortality, and the effects of localities, employments, conditions, and circumstances on the public health, and gather such information in respect to those matters as it may deem proper for diffusion among the people."

The State Board of Health is the head of the administration of public hygiene in the State, but no power is conferred upon it to dictate to or direct the local Boards; we can only give them information, advice, and practical suggestions when requested, and keep them advised of any danger to the public health. If local Boards neglect to perform their duty, the State Board is powerless to compel them to it, except indirectly, by arousing public sentiment against such inaction and exposing the dangers to which such inaction invites. This being the relation which the State Board bears to local Boards, it becomes necessary, in order to secure beneficial results to the State, to compel the organization of local Boards of Health or Health Officers throughout the State. In every town having five hundred inhabitants it is an absolute necessity, and to this end your Secretary has been turning his attention ever since the passage of the law authorizing such action. The result has not been quite satisfactory, but progress so far shows us that we are

in closer relation with every part of the State than before. One great drawback that we have to contend with is the difference of the constituted authorities to the formations of Health Boards or appointing Health Officers; many say, "Oh, our town is healthy enough. We have got along so far without Health Officers, why need them now? Time enough when epidemics come to appoint a Health Board." And strange to say, they are sustained in this suicidal policy by many of the most prominent citizens of the place. Again, when requested to appoint a Health Officer we are met with the supposition that the town does not contain five hundred inhabitants.

In one instance where a Health Officer was refused on such a plea, the census showed one thousand two hundred population. Another obstacle placed in the way of sanitary organization, is the unwillingness of Supervisors to allow Health Officers any but the most trifling compensation, and some think such officer should be content with the glory of the name, without fee or reward. It speaks badly for the intelligence of a community that allows itself to be governed by a class of men who are so blind to the welfare of their constituents that they would prefer being compelled through disease to appoint a Sanitary Board, rather than pay a proper officer to prevent its advent. Fortunately, such cases are rare; but, nevertheless, they exist in California to-day. It is just here that the State Board needed more power; the law has now given it to them, or, rather, will give it when the present law is amended by the correction of a clerical error. The following is the law as it stands in the statute books:

AN ACT

To amend section three thousand and sixty-two of, and to add a new section to, an Act entitled "An Act to establish a Political Code," approved March 12, 1872, relating to Boards of Health.

[Approved March 1, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and sixty-two of said Act to establish a Political Code is amended so as to read as follows:

Section 3062. The Board of Supervisors of each county must appoint, in each unincorporated city or town of five hundred or more inhabitants, a Health Officer, who has all the duties and powers of the Board of Health and Health Officer, as specified in this and the two preceding articles.

SEC. 2. There is added to said Code a new section, to be called section three thousand and sixty-four, which shall read as follows:

Section 3064. The Board of Supervisors must fix the salary or compensation of Boards of Health or Health Officers, and provide for the expenses of enforcing the provisions of this article. If the Board of Supervisors or Board of Trustees, Council, or other corresponding Board of any incorporated town, neglects to provide a Board of Health or Health Officer by the first day of July, eighteen hundred and eighty-nine, the State Board of Health may direct the District Attorney of the county to begin an action against such Board of Supervisors, or Board of Trustees, or corresponding Board, to compel the performance of their duty, or may appoint a Board of Health, or Health Officer with the powers of a Board of Health, for such town or city, and the expenses of such Board of Health, or Health Officer, shall be a charge against the incorporated city or town for which such appointment shall be made; and when the appointment is made for unincorporated towns the expenses of the Board of Health, or Health Officer, is a charge against the county.

By an unfortunate error the bill was made to read first day of July, 1887, instead of first day of July, 1889. It went to the Governor that way, and was so signed. Although it was apparent to every one in the State that 1889 was intended instead of 1887, yet it will scarcely be believed that this clerical error has been made the basis of willful violation of the law, rendering it nugatory as far as the power of enforcing it lay with our Board. In one county in this State containing several

towns of over five hundred inhabitants, the Supervisors absolutely refused to appoint Boards of Health or Health Officers except as a voluntary measure, their District Attorney assuring them that owing to that one defect in the wording of the law it could not be enforced by our Board. It is a strange commentary upon the civilization of the nineteenth century, that the most beneficent measure possible to be effected for the preservation of the lives, health, and happiness of a community should be objected to because one letter in a law was unwittingly inserted instead of another. At the coming Legislature we hope to have this mistake corrected, and then we trust we will have no further trouble in perfecting sanitary organizations throughout the State, which, by mutual understanding, unrestricted intercourse, and hearty coöperation with the State Board of Health, will place us in a position to guard against the advancement of epidemic disease, or in speedily suppressing it, if it should make its presence known. Although this law regarding local Boards of Health has been impaired in its full usefulness by the fatal defect in its wording, it has not, by any means, been inoperative. The law requiring all incorporated cities and towns to organize local Boards of Health was passed in 1887; under it some nineteen Boards organized; of these, eight alone were active, the others existed in name only, never meeting or doing any sanitary work. No less than forty-one incorporated towns had no health organization whatever, although the law plainly stated that they should; of course, the unincorporated towns had likewise no Health Boards, and so far as any legal protection given to citizens for the defense of their lives from infectious disease was concerned, they had none.

At the session of the Legislature in 1888 the law authorizing the formation of local Boards of Health in unincorporated towns and those containing five hundred inhabitants, was passed; since then, of the sixty odd incorporated towns in the State, inclusive of those not incorporated, the following have organized local Boards of Health or Health Officers that are now in communication with this Board, and doing good sanitary work in their respective localities:

Angels Camp, Alameda, Azusa, Anaheim, Colusa City, Chico, Cloverdale, Colton, Calico, Colfax, Bloomfield, Biggs, Bishop Creek, Berkeley, Bakersfield, Benicia, Downey, Downieville, Dixon, Elsinore, Eureka, El Monte, Folsom, Fort Bragg, Fresno, Gridley, Georgetown, Grass Valley, Haywards, Hollister, Jackson, Julian, Livermore, Los Angeles, Long Beach, Little Stoney, Lincoln, Madera, Modesto, Marysville, Monrovia, Martinez, Mariposa, Napa City, Needles, North San Juan, Nevada City, Orland, San Luis Obispo, Oroville, Oakland, Ontario, Pomona, Petaluma, Pleasanton, Pasadena, Redlands, Rocklin, Red Bluff, Redwood, Rio Vista, Riverside, Sacramento, Santa Monica, Stockton, San Francisco, Susanville, Santa Ana, Santa Paula, San Diego, San Bernardino, San José, Santa Barbara, Suisun, South Pasadena, St. Helena, Solano, Santa Maria, Sierra City, San Pedro, Santa Cruz, Santa Rosa, Sisson, Selma, Truckee, Ukiah, Ventura, Visalia, Willows, Watsonville, Woodland, Yreka, Vacaville, Lodi, Antioch, Oakdale, National City, Pacific Grove, Tehachapi.

We thus have, in active operation, over one hundred Health Boards and Health Officers, up to the end of the fiscal year, June 30, 1890, in looking after the sanitary welfare of their different localities, in contrast with but twenty-two, four years ago; and of these, only one half existed

in anything but name. So far, the law making compulsory the organization of local Boards of Health, or Health Officers, has been fairly successful, but it can be made more so when all legal quibbles to its enforcement are removed.

The law passed at the last Legislature, requiring burial permits to be issued before any human body can be buried, will, in the near future, be generally obeyed. In answer to the following circular upon this and other points, we may give the answers received from seventy-six localities, in different counties, as indicating the general result so far attained in conformity with the law:

CIRCULAR OF THE STATE BOARD OF HEALTH.

SACRAMENTO, March, 1890.

To the honorable Board of Supervisors, Trustees, Councilmen, and Health Officers, of—County, Cal.:

GENTLEMEN: The State Board of Health, desirous of ascertaining certain facts in regard to the operation of the laws relating to public health, with a view of adding to their efficiency at the next session of the Legislature, requests, at your earliest convenience, a reply to the following questions:

First—How many Boards of Health have been organized, or Health Officers appointed, in your county, since the law requiring the same has been passed?

Second—How many towns, with an estimated population of five hundred inhabitants, or over, are there in your county, and their names?

Third—Has the law requiring burial permits to be issued before the interment of any human body in your county been fully obeyed? If not, can you give any reason why it has not been?

Fourth—Has the law relating to the vaccination of public school children been carried into effect by your Board? If not, can you assign any valid reason why it has not?

Fifth—Have births and deaths been reported to and recorded by the County Recorder, as required by law? If not, can you give any good reason why this law has been disobeyed?

Sixth—Have any prosecutions been instituted in your county against offenders for violation of the laws relating to public health?

G. G. TYRRELL, M. D.,
Secretary.

H. S. ORME, M. D.,
President.

In answer to the first question, we ascertained that some forty-eight local Boards of Health had been organized, and some forty-nine Health Officers appointed.

To question number two, there were recorded some forty replies, the majority of the correspondents being unable to say what was the number of the inhabitants in their towns.

To the third question, requiring burial permits, the answers were varied:

Alpine County.—There was no Board of Health or Health Officers, and no burial permits were issued.

Contra Costa County.—Burial permits were issued in those places having Health Officers, but in other places the law was not obeyed.

Colusa County.—Burial permits were issued by Health Officers and the law generally obeyed.

El Dorado County.—The law has been generally obeyed.

Fresno County.—The law has been obeyed to a certain extent; the opinion exists that the law is not general, and only applicable to cities and towns, and hence ignored by parties living outside these places.

Humboldt County.—Here the law has not been enforced in towns outside of Eureka, as health organization in the county has been deficient.

Kern County.—Has generally obeyed the law.

Inyo County.—The law has not been enforced, and consequently the mortality of the county unknown.

Lake County.—They have no health organization, and the law requiring burial permits is ignored.

Lassen County.—Dr. Spaulding thinks the law has been generally obeyed, but as the health organization is incomplete, many times it must be evaded.

Los Angeles County.—The law in this county has been, perhaps, better obeyed than in any other; the Health Boards and Health Officers are better organized than in any other county, and consequently see that obedience is exacted.

Calaveras County.—In this county the law is generally ignored, and its mortality is quite unknown in consequence, Angels Camp being the only town reporting to the Board.

Butte County.—The law is generally obeyed where known; any failure is through ignorance.

Alameda County.—The law is generally obeyed where health organizations exist; in other towns such is not the case.

San Joaquin County.—The law is generally obeyed, and where health organizations exist, is enforced.

Siskiyou County.—In this county the law is obeyed where health organizations exist; otherwise not.

San Mateo County.—The law is partially obeyed; not as fully as contemplated by its passage.

Sacramento County.—The law has been obeyed where Health Officers or Boards exist.

Placer County.—The law is generally obeyed.

Orange County.—The law has not been enforced, the health organization of the county being very imperfect.

Nevada County.—The law has been very generally observed.

Napa County.—It has been obeyed wherever health organizations exist.

Mariposa County.—In this county the law has been generally obeyed.

Mendocino County.—The law has been obeyed in a few towns, but oftener neglected.

San Francisco County.—The law is fully obeyed.

San Bernardino County.—The law is partially obeyed, but not fully, owing to the abolishing of the County Health Officer.

Sonoma County.—The law is generally obeyed.

San Diego County.—The law has been generally obeyed; in many of the outlying districts it has not, as no Health Officers were appointed to see that it was.

San Benito County.—Hitherto has not obeyed the law, but is now issuing permits before burial is allowed.

Amador County.—Completely ignores the law, and the District Attorney has made no attempt to enforce it as far as can be ascertained.

Solano County.—Is very generally having the law obeyed, as her health organization is good.

Stanislaus County.—The law has been generally observed in this county.

Sierra County.—The law is carried out where Health Officers are appointed; in other parts it is ignored.

Santa Barbara County.—The law is not obeyed except in Santa Maria and Santa Barbara; ignorance of the law is the supposed cause.

Sutter County.—The law is not generally obeyed in this county, as it has no health organizations.

Santa Cruz County.—The law has only been partially obeyed, arising more from indifference than neglect.

Ventura County.—The law has been ignored here entirely, except in Santa Paula.

Yuba County.—The law has been obeyed wherever health organizations existed.

Yolo County.—The law has been partially obeyed, but in many towns no attention has been paid to it.

San Luis Obispo County.—The law in this county is not obeyed, owing to the lack of sanitary organization.

Shasta County.—The law is partially observed in the county, especially in the incorporated towns.

Tehama County.—The law is not obeyed, except in places having Health Boards or Health Officers.

VACCINATION.

The law making vaccination compulsory on all children attending or desirous of attending the public schools of this State, has up to the present time been held in abeyance, pending the decision of the Supreme Court upon a case that was originally brought in the Superior Court of Santa Cruz County, by D. K. Abeel against D. C. Clark, Principal of the High School of that county, to compel the admission to the school of his two sons, D. K. and James, who were refused admission to the school because of non-compliance with the Vaccination Act, and the Court gave judgment in favor of the Principal. Abeel took an appeal to the Supreme Court, which tribunal has affirmed the decision of the Court below. The Court says:

The Act referred to is designed to prevent the dissemination of what, notwithstanding what medical science has done to reduce its severity, still remains a highly contagious and much dreaded disease. While vaccination may not be the best and safest preventive possible, experience and observation, the test of the value of such discoveries, dating from 1798, when Jenner disclosed it to the world, have proved it to be the best method known to medical science to lessen the liability to infection with the disease.

This being so, it seems highly proper that the spread of smallpox through the public schools should be prevented or lessened by vaccination, thus affording protection both to the scholars and the community.

Vaccination, then, being the most effective method known of preventing the spread of the disease referred to, it was for the Legislature to determine whether the scholars of the public schools be subjected to it, and we think it was justified in deeming it a necessary and salutary burden to impose upon that general class. The remarks of Judge Cooley in his work on Cons. Lim., p. 157, are applicable here, where he says: "What is for the public good, and what are public purposes, and what does properly constitute a public burden, are questions which the Legislature must decide upon its own judgment, and in respect to which it is invested with a large discretion which cannot be controlled by the Courts, except, perhaps, when its action is clearly evasive, and where under pretense of lawful authority it has assumed to exercise one that is unlawful."

The decision of the Supreme Court having now definitely settled the constitutionality of the law, we expect that no trouble will be experienced in having it enforced. The protection given to the State by this law against the spread of smallpox is beyond computation, as if properly carried out and the rising generation successfully vaccinated by competent physicians, we need be under no apprehension of any

extensive epidemic taking place. In this State especially, this precaution is absolutely necessary, as we are constantly threatened by an invasion of the disease through Mexico, where it is endemic.

BIRTHS.

The fifth question, "Have births and deaths been reported to and recorded by the County Recorder?" has been answered by the majority, that the law has been obeyed where Health Boards and Health Officers existed, but otherwise, parties were indifferent to the registration, as they did not see why they should do the State any service without adequate compensation therefor. For this reason, births have not been returned or recorded except in a very few instances.

The State Board of Health at the last session of the Legislature presented a bill providing for the registry of births and deaths, for which a compensation of 25 cents was to be allowed for each birth and death filed with the County Recorder, which passed the Senate and Assembly, but, for some reason, failed to be transmitted to the Governor for his signature. This omission, your Secretary finds, has prevented the recording of births, and, no doubt, many of the deaths in this State, which would have been duly certified to by the interested parties. This omission must be rectified at the next meeting of the Legislature, in order to collect the vital statistics of the State with anything like unto completeness. In regard to prosecutions for non-compliance with the law, we find that in Pomona one physician was fined \$10 for not reporting a death. In Fresno and Merced, some recalcitrant physicians have been prosecuted; parties have also been prosecuted in El Dorado, San Mateo, Alameda, Placer, Los Angeles, San Francisco, and Sacramento Counties, but, as a rule, no prosecutions have been instituted, and, consequently, an indifference has arisen to the laws of health in many places where a few vigorous prosecutions for non-compliance with the law would have been followed by the most important results, in a sanitary point of view. We think that Health Officers are too indulgent in these matters, and permit neglect regarding the preservation of the public health to be practiced with impunity, whereas such neglect in regard to the preservation of the lives of horses or the welfare of cattle would be prosecuted vigorously.

HEALTH BOARDS AND HEALTH OFFICERS.

Complaint has been made that in some counties with towns of five hundred inhabitants and over the Supervisors have failed in their duty of appointing Health Boards or Health Officers. Unfortunately, these complaints have some foundation in fact, from the dislike of County Boards of Supervisors to add to the expenses of the county by appointing Health Officers whom they would have to pay. When they can get a physician who is content with the honor and asks nothing for his services, the appointment is made without any urging, and the Board considers it has done its whole duty in such cases. It is needless to say that unpaid work is never profitable to the community in which such arrangements are made. The position of Health Officer is one of the greatest responsibility; in his hands are the issues of life or death; upon his vigilance and watchful care depends the health or sickness of a

whole township; he must have an honest pride and interest in his calling, and must set aside the ties of blood or friendship where they interfere with the proper discharge of his duty. We are very frequently asked, as a Board, to define the duties of a Health Officer, or what is expected of him, the amount he ought to be paid, etc.

To these inquiries your Secretary has replied that in the broadest sense, the duty of Sanitary Boards and Sanitary Officers is to prohibit or abate whatever is unmistakably perilous to public health. The individual Health Officer should in the first place put himself in friendly relations with the physicians of the district in which he is situated, cultivate their esteem and respect, not as antagonistic to their welfare, but as a common helper in the cause of humanity and health. The Health Officer should make it his business to ascertain the location of every infectious disease within his jurisdiction, then place a distinctive sign upon the premises that such and such a disease is in the house; but before he can do this, he must have the Supervisors or the Town Trustees pass an ordinance requiring all houses harboring any infectious disease, such as smallpox, diphtheria, scarlet fever, etc., to bear a distinctive flag or card of warning to the public that such a disease exists. It is the duty of the Health Officer to then ascertain as accurately as possible the source from which the disease has been derived. If the cause is local, have it remedied or removed, and see that the place infected is thoroughly disinfected when the disease has abated. It is also the Health Officer's duty to make periodical inspections of the water supply of the town, and where pollution is likely to occur from the proximity of privies, to have them removed, their sites disinfected and filled up with dry earth. It is his duty also to see that all streets, alleys, and back yards are kept in a sanitary condition, and all accumulated filth removed and destroyed. It is also an important duty of the Health Officer to see that the food supply of his people is fresh and healthy, and no diseased meat be permitted to be sold; he must also supervise the burial of deceased persons, and see that none are interred without first procuring his permit, which must be transmitted to the Recorder by the person receiving it. He thus contributes to the general stock of knowledge with regard to the sanitary condition of the people, and the preventable causes of sickness and mortality, which, when collected and published in the Biennial Report, may guide the Legislature in the extension and amendment of sanitary laws. All these duties, properly performed, take time, education, and experience, and should not be expected without adequate compensation.

We regret to say that many of our Health Officers have been asked to give their services for the honor of holding the office, and a majority get the smallest recompense a miserly Board of Supervisors can bestow. In many counties containing many towns with over the population required by law, the authorities have appointed neither Boards of Health nor Health Officers, for the reason that they think it is putting the county to a needless expense, utterly regardless of the many lives it would save from ordinarily preventable disease, or the greater expense involved should an epidemic occur through their criminal negligence. The beneficent efforts arising from properly organized Boards of Health cannot be more conclusively shown than appears in the death rate in England and Wales during the past seventeen years. In the twenty largest English towns, as noticed in an address by Dr. A. Hill, before the Section on Hygiene at the meeting of the British Medical Association, he demon-

strates that the death rate has fallen from 24.4 to 19.0 per thousand. While taking certain individual communities, we find that in London the death rate has fallen from 22.5 to 17.4; in Liverpool, from 25.9 to 21.6; in Birmingham, from 24.8 to 18.4; in Salford, from 29.3 to 20.3; in Bristol, from 23.1 to 17.6; and in Maidstone, in the same time, it has declined from 22.8 to 13.7. Calculated to percentages, the diminution of the general mortality for England and Wales is 15.6 per cent, and for the twenty large towns it is 22.1 per cent; for London, 22.6 per cent; for Liverpool, 16.6 per cent; for Birmingham, 25.8 per cent; for Manchester, 20 per cent; for Sheffield, 19 per cent; for Salford, 30 per cent; for Maidstone the diminution in the death rate has attained the extraordinary figure of 40 per cent.

These results teach a lesson that should be impressed upon the mind of every sanitarian, encouraging him in the fulfillment of his duty to the public, and should not be forgotten by public officials or those opposed to active sanitary measures as unnecessary, because the immediate result is not at once apparent. In our own State our statistics are not sufficiently complete to draw any deductions as to the saving of life effected since our local Boards have been organized. We are yet too young in sanitary organization to demonstrate satisfactorily what we have accomplished, but what has been done in Europe can as most assuredly be done here, and we can look forward to the diminution of our death rate henceforward with as much certainty as we can to any problem depending upon organization for its solution.

As Dr. Hill says: "Two hundred years ago if any one predicted that the then death rate of eighty per thousand in London would be reduced to twenty, his statement would have only excited ridicule. If so late as 1873 the prognostication had been made that the sanitary activity then commencing would result in the comparatively short period of seventeen years in a reduction of the death rate in the twenty large English towns to the extent of 22 per cent, and that of Salford to the extent of 30 per cent, or of Maidstone of 40 per cent, such a forecast would have been thought visionary; yet these magnificent results are now accomplished facts. But," he says, "it cannot be supposed that the limit of improvement is reached, that the resources of preventive medicine are exhausted; on the contrary, there is good reason to believe that almost, or quite as much, remains to be done as has already been accomplished."

These encouraging facts should be incentives to our Board to continue its good work with renewed zeal. We must importune the Legislature to grant us such power that every hamlet will have its Health Officer, and every town its Board of Health. With the grand results achieved in the Old World by well directed sanitation, is there any reason why we should allow hundreds of valuable lives to be sacrificed yearly which might have been saved by preventive medicine? Or is there any reason that diphtheria, scarlet fever, or typhoid germs should be allowed to scatter their seeds of death through a village or town, that the fragmentary portion of a dollar might be taken off our taxes, and hundreds added to our expenses in caring for the sick, or giving them interment, to say nothing of the widows' tears, or the orphans' cries, or the bereaved homes of those whom we have thus allowed to be criminally murdered, to save an expense that is more necessary to the welfare of the people than any other expenditure incurred by municipal or county authority? In the face of all statistics to the contrary, the prejudice existing in the minds

of many County Supervisors and many City Trustees against the utility of Boards of Health, Health Officers, and sanitation in general, can only be attributed to ignorance of the subject upon the part of these objectors. They require education upon the law that decrees that without cleanliness health is impossible; that disease is not a natural law of mankind, and that wherever it exists, in the large proportion of cases, it is the result of violation of natural law, and the indifference, apathy, or ignorance of man to his surroundings. In a not very distant city there lives now a gentleman who built himself a fine new mansion in close proximity to a city cemetery. Within fifty feet of the cemetery fence he sunk his well, and from it draws all the water for stock and culinary purposes, evidently utterly ignorant that such water must contain the putrid juices draining from the decomposing bodies in its vicinity, and positively dangerous to the health of man or beast. If such a man lost his family or was killed himself by any infectious disease, it would immediately be laid to the dispensation of Providence, or anything else, except to the owner's ignorance of hygienic law or observances.

In conversation with a Supervisor, one day, upon the necessity of appointing a Health Officer in a certain town, he said: "What is the good of a Health Officer; we have no sickness here and have had none; why should we go to the expense of paying a man when there is nothing for him to do; wait until some epidemic breaks out, and then we will appoint a man right away." Now this was apparently an intelligent man, yet he could not see the value of prevention; he could not see that the expenditure of a few hundred dollars in investigating the likely sources of disease was cheaper than spending thousands of dollars in arresting a disease that might be fatal to many of the best citizens of the place before its march could be arrested. To deal with such intellects reason is powerless, and in such cases the State Board of Health needs compulsory power to establish Health Officers and Health Boards whenever such organizations are necessary for the protection of the public health.

STATE ANALYST.

In this connection it might be stated that our Board is at a great disadvantage in regard to our State Analyst. The law appointing a State Analyst neglected to appropriate any funds to enable him to employ the means of making analyses, in the way of proper assistants; the duties otherwise of the State Analyst being so numerous and exacting that he cannot possibly devote the time necessarily required in making chemical investigation of our mineral springs, adulterated foods, etc., without further help, and this cannot be had without compensation. As a consequence, our mineral springs are still unanalyzed, and adulterated articles of food are still upon the market, as our Board has no means of having them investigated. At the last meeting of the Legislature your Secretary had the sum of \$5,000 inserted in the "Appropriation Bill" for the use of the State Analyst, to enable him to employ for two years the assistance necessary to give that attention to our mineral springs and our food supply which the law contemplated when it created the office. When the appropriation bill was reported by the committee to the Senate, with the clause appropriating "\$5,000 for the use of the State Analyst for two years, to enable him to employ

such necessary assistance as he might require in analyzing the mineral springs of the State, or the adulterations of its food supply," it was stricken out upon the motion of a Senator, who thought "it was a useless expenditure of the people's money, and if they wanted their springs analyzed, or their food supply examined, to do it themselves." This argument was sufficient to defeat the proposition, and, as a result, we are still in ignorance of the medicinal value of our springs, or of the extent to which our food supplies are adulterated. The State Analyst is at present in Europe, and favored with credentials from our Board, will attend the International Medical Congress in Berlin, where he expects to derive some valuable information in sanitary matters, which he intends to impart to this Board in the form of a report, which he will prepare for publication upon his return.

The necessity of having an official analysis of the different mineral springs of this State is becoming more urgent every day; few days elapse that we are not applied to for information upon this subject from every part of the United States, and it is humiliating to have to reply that no official analyses of any of the springs have yet been made. It is incumbent, therefore, upon our Board to leave no means untried to have our coming Legislature appropriate at least \$5,000 for this purpose. With this sum our Analyst thinks that he can employ such assistance that in two years he will have all the principal mineral springs classified and analyzed, and thus enable us to give definite and reliable information to those seeking health at these resorts. It is believed that numerous articles of food supplies in our markets are adulterated, and that an analysis would soon declare the truth or falsity of such belief. The charge of wasting the public funds in the ascertainment of such facts is the most diaphanous that could be brought against the appropriation. Health has a money value outside every other consideration, and of so much importance is the factor of health in the general progress of industrial and business interests, that the most cordial coöperation should enlist itself in the support of all agencies designed in its promotion; instead of wasting public funds the employment of State money for such purposes is adding wealth to the community. It is asking funds to develop this wealth by unfolding an agency whereby health will be promoted; the business interest of every community should enlist itself in this cause, and lend its support as a profitable investment. We trust at the coming meeting of the Legislature this appropriation will be made, and its necessity commend itself to our legislators.

SMALLPOX.

During the legislative session of 1887, smallpox was epidemic in Mexico; it crossed our southern border and commenced its travels northward. Your Board having no funds at its command to take any preventive measures for its arrest, appealed to the Legislature for a contingent fund, to be placed at the disposal of the Governor, to be used at the discretion of the State Board of Health. An Act was accordingly passed appropriating the sum of \$10,000 for the use of the Board. With a portion of this fund we appointed Inspectors at all points threatened by an invasion of the disease, with gratifying success. Later, your Board deemed it advisable to send a delegate to the National Conference of State Boards of Health, to devise some means whereby an interstate

notification of disease might be established. This was agreed upon, so that now we are forewarned of any epidemic disease that may arise in any State with which we are in unison. During the present year we were apprised of the fact that smallpox in a severe form was again prevalent in Mexico, and to ascertain its limits and locality, your Board appointed a Medical Inspector to visit the infected places and report our danger. In this he was materially aided by the United States Government appointing our Inspector as their Inspector, thus giving him the power to take such precautionary measures in the Territories of New Mexico and Arizona as he might deem necessary. After a month's close inspection and examination of all the infected places, your Inspector reported that the danger to our State was not now imminent, but that as winter approached we might expect a fresh outbreak of the disease, and must be prepared to resist the invasion by quarantine measures. The doctor's report will be placed before you hereafter.

LEGISLATION.

Your Board at this time deemed it prudent to send a delegate to Nashville to represent us at the meeting of the National Conference of State Boards of Health, to obtain its views upon certain interstate sanitary matters, and also to devise some methods by which the purity of our potable waters might be preserved. His report is herewith appended. These various sanitary precautions had to be paid for out of our contingent fund, provided to prevent the introduction of contagious and infectious disease. The sums expended since 1887, or during the past three years, amounted to \$4,017 55, leaving a balance to the Governor's credit of five thousand and odd dollars. This, in case an epidemic of smallpox breaks out in Mexico or along our southern border, will not be sufficient to carry us for the next two years as, we may have to quarantine against cholera, which now threatens to invade our coast. It would, therefore, be prudent to seek through the Legislature a replenishment of our contagious disease fund, in order to be prepared for any emergency that may arise. The present fund has been so judiciously and carefully expended that the Legislature may be inclined to think that enough of the fund remains to give us all the protection necessary. If we could be sure of no greater need in the future than there has been in the past, it is probable that we have enough, but if unfortunately we had to place Inspectors at every inlet to the State, the present fund would go but a short way in accomplishing the sanitary measures needful to ward off infectious disease that threatened us at every point. We would therefore ask that our claim be placed in the appropriation bill as one necessary to the sanitary welfare of the State. As your Board is aware, during the last session of the Legislature we had several bills before that body amendatory to our health laws. Of these we succeeded in passing a law making vaccination compulsory on all children attending the public schools of the State, which reads as follows:

AN ACT

To encourage and provide for a general vaccination in the State of California.

[Approved February 20, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The Trustees of the several common school districts in this State, and Boards of common school government in the several cities and towns, are directed to exclude from the benefits of the common schools therein any child or any person who has not been vaccinated, until such time when said child or person shall be successfully vaccinated; *provided*, that any practicing and licensed physician may certify that the child or person has used due diligence and cannot be vaccinated so as to produce a successful vaccination, whereupon such child or person shall be excepted from the operation of this Act.

SEC. 2. The Trustees or local Boards, annually, or at such special times to be stated by the State Board of Health, must give at least ten days' notice, by posting a notice in two or more public or conspicuous places within their jurisdiction, that provision has been made for the vaccination of any child of suitable age who may desire to attend the common schools, and whose parents or guardians are pecuniarily or otherwise unable to procure vaccination for such child.

SEC. 3. The said Trustees or Boards must within sixty days after the passage of this Act, and every year thereafter, ascertain the number of children or persons in their respective school districts or subdivision of the city school government being of an age suitable to attend common schools, who have not been already vaccinated, and make a list of the names of all such children or persons. It also shall be the duty of said Trustees or Boards to provide, for the vaccination of all such children or persons in their respective school districts, a good and reliable vaccine virus wherewith to vaccinate such children or persons who have not been vaccinated. And when so vaccinated to give a certificate of vaccination, which certificate shall be evidence thereof for the purpose of complying with section one.

SEC. 4. The necessary expenses incurred by the provisions of this Act shall be paid out of the common school moneys apportioned to the district, city, or town. And if there be not sufficient money, the Trustees must notify the Board of Supervisors of the amount of money necessary, and the Board must, at the time of levying the county tax, levy a tax upon the taxable property in the district sufficient to raise the amount needed. The rate of taxation is ascertained by deducting fifteen per cent for delinquencies from the assessment, and the rate must be based upon the remainder. The tax so levied must be computed and entered upon the assessment roll by the County Auditor, and collected at the same time and in the same manner as State and county taxes, and when collected shall be paid into the County Treasury for the use of the district.

SEC. 5. The Trustees of the several school districts of this State are hereby required to include in their annual report, and report to the Secretary of the State Board of Health, the number in their several districts between the ages of five and seventeen years who are vaccinated and the number unvaccinated.

SEC. 6. This Act shall take effect immediately.

This law, as before remarked, was held in abeyance until a test case was taken to the Supreme Court to determine its constitutionality. This being given in favor of the law, we will now have it enforced throughout the State, and thus assure the vaccination of the present generation of school children, to the great protection of the State. The next law that we were enabled to pass was the important one establishing Boards of Health and Health Officers, which we have before quoted. Another equally important measure relating to the interment of human bodies was passed by the Legislature, and approved by the Governor, as follows:

AN ACT

To amend section three thousand and eighty-four of an Act entitled "An Act to establish a Political Code," approved March 18, 1872, relative to the interment or cremation of human bodies.

[Approved February 25, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and eighty-four of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, is hereby amended so as to read as follows:

Section 3084. No person shall inter, cremate, or otherwise dispose of any human body, in any city, county, or city and county, without having first obtained a permit therefor. In incorporated cities, or counties, or cities and counties, the permit must be obtained from

the person authorized to grant the same by any law, ordinance, or resolution passed for that purpose. But in the absence of such law, ordinance, or resolution, the permit must be obtained from either the Coroner, or Health Officer, Board of Health, or if the Coroner be absent, then from the Health Officer or Board of Health; and if there be no Board of Health or Health Officer, then from a Justice of the Peace. The person applying for a permit must produce and file with the officer issuing the permit a certificate signed by a physician, or a Coroner, or two reputable citizens, setting forth, as near as possible, the name, age, color, place of birth, occupation, date, locality, and cause of death of deceased. And no permit shall be granted without the production of such certificate. Such permit must be filed with the County Recorder, and the person so filing is entitled to the compensation provided for in section three thousand and seventy-seven of this Code; but if any other registration of the death of the deceased shall have been made, the Recorder must record the name but once.

SEC. 2. This Act takes effect thirty days after its passage.

This Act, when properly enforced, will enable your Board to get a very complete list of all the deaths and their causes in California. As you have heretofore seen, it is not as effective as it will be by a little supplemental legislation, which we contemplate this winter. The last law that we succeeded in getting passed, was an amendment to the Penal Code, making it a misdemeanor to violate any of the laws relating to the preservation of the public health, which reads as follows:

AN ACT

To amend section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February 14, 1872, relating to the disposal of human dead bodies, and preservation of the public health.

[Approved February 25, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three hundred and seventy-seven of an Act entitled "An Act to establish a Penal Code," approved February fourteenth, eighteen hundred and seventy-two, is amended so as to read as follows:

Section 377. Every person who is charged with a duty relating to the registration of deaths, under chapter three, title seven, of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, who

1. Willfully fails to keep a registry of the name, age, residence, and time of death of a decedent; or,

2. Willfully fails to register with the County Recorder a certified copy of such register, as is provided for in said chapter; or,

3. Willfully interrs, cremates, or otherwise disposes of any human body, in any city, county, or city and county, without having first obtained a permit, as provided for in said chapter; or,

4. Willfully grants a permit for the interment, cremation, or disposition of a dead human body, without the certificate provided for in said chapter; or,

5. Willfully violates any of the laws of this State relating to the preservation of the public health;

Is guilty of a misdemeanor, and is, unless a different punishment for such violation is prescribed by this Code, punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding one thousand dollars, or by both such fine and imprisonment.

Under this Act we are enabled to prosecute violators of the law. Its weakness lies in the wording of the statute which requires the prosecutor to prove a *willful* violation of the law. This is almost an impossibility to do. The wording of the statute should be changed so that "willfully" may be expunged for the word "knowingly," or some other word expressing knowledge of the Act, without necessarily implying willfulness in its violation. We may congratulate the Board on its success in obtaining the foregoing amendments to its health laws. It is now incumbent upon us to supplement this legislation by the addition of the law which through misadventure failed to reach the Governor last session, and without which it will be impossible to collect such statistics as will make our report valuable in the matter of births, marriages, and deaths. The proposed law reads as follows:

AN ACT

To amend sections three thousand and seventy-seven, three thousand and seventy-eight, three thousand and eighty, and three thousand and eighty-two of an Act entitled "An Act to establish a Political Code," approved March twelfth, eighteen hundred and seventy-two, relative to the registry of births, deaths, and marriages.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three thousand and seventy-seven of said Act to establish a Political Code is amended so as to read as follows:

Section 3077. All persons registering marriages, births, or deaths, must, at the close of every calendar month, file with the County Recorder a certified copy of their register. Each certificate must certify, as nearly as may be ascertained, the name in full, age, occupation, term of residence in the city or county, birthplace, condition, whether single or married, widow or widower, sex, race, color, last place of residence, and also, when of accidents, the cause of death; and also, when of births, the sex and color of the child, and name and nativity of its parents. Each person filing such copy is entitled to a compensation of twenty-five cents for each birth, marriage, or death, so recorded, and the Recorder must give a certificate of such filing to the person entitled thereto, stating the number of deaths, marriages, or births recorded, and the amount due therefor. Upon the presentation of the Recorder's certificate to the County Auditor, he must deliver at once, without any order of the Board of Supervisors, a warrant for the sum due, payable out of the General Fund of the County Treasury, and the County Treasurer is directed to pay the same. The Auditor must report the amount of warrants so drawn each month to the Board of Supervisors.

SEC. 2. Section three thousand and seventy-eight of said Act entitled an Act to establish a Political Code is amended so as to read as follows:

Section 3078. If, at any birth, there is no attending physician or midwife, the parents must make the report, and are entitled to the same compensation prescribed in the preceding section.

SEC. 3. Section three thousand and eighty of said Act to establish a Political Code is amended so as to read as follows:

Section 3080. The County Recorder, at the close of each month, must transmit to the Secretary of the State Board of Health, at Sacramento City, a certified abstract of the register of births, marriages, and deaths, prepared in the manner prescribed by the Secretary, and upon blanks furnished by him.

SEC. 4. Section three thousand and eighty-two of the Act to establish a Political Code is amended so as to read as follows:

Section 3082. Any person on whom a duty is imposed by this chapter, who fails, neglects, or refuses to perform the same, is liable to a penalty of fifty dollars and costs of suit for each offense, to be recovered in an action by the District Attorney of the proper county; one half of the penalty to be retained by him for his services, and the remainder to be paid into the General Fund of the county. The Secretary of the State Board of Health and the County Recorder must inform the District Attorney of any neglect of duty as prescribed in this chapter.

SEC. 5. This Act takes effect thirty days after its passage.

Had this law been transmitted to the Governor upon its passage, instead of being allowed to lie upon the Secretary's desk, our work for the past two years would have been more complete. This law removes the objection of all persons registering deaths, births, and marriages, viz.: that they get no compensation for their trouble. This has been the most prolific source of complaint. Persons say that they will not do the business of the State without being paid for it; that if the State considers it worth its while to collect and tabulate its vital statistics, it should be willing to pay for the service rendered. The bill here presented provides against this objection, by giving a compensatory fee of 25 cents for every birth, marriage, and death recorded. This will insure the registration of nearly all births, deaths, and marriages, and give us a legal record upon the Recorder's books, which will be invaluable for future reference. Supplementary to this, your Secretary presented an amendment to the Penal Code, which was introduced by Hon J. M. Briceland, advocated, and passed by him in the Senate, as follows:

AN ACT

To amend section three hundred and seventy-eight of an Act entitled an Act to establish a Penal Code, approved February fourteenth, eighteen hundred and seventy-two, relating to the preservation of the public health and safety and registration of births, deaths, and marriages.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three hundred and seventy-eight of the Act entitled an Act to establish a Penal Code, approved February fourteenth, eighteen hundred and seventy-two, is amended so as to read as follows:

Section 378. Every person charged with the performance of any duty under the law relating to the public health, and every person charged with the duty of keeping a register of births, marriages, or deaths, and every Recorder, or other person, whose duty it is to report to the State Board of Health, who willfully neglects or refuses to perform the same, and every person who willfully refuses to obey the rules and regulations passed by any Board of Health, or Health Officer having the powers of a Board of Health, is guilty of a misdemeanor.

When transmitted to the Assembly it received a second reading, but by some misunderstanding it never reached a third reading, and as a consequence failed to become a law. If this amendment to the Code had passed and received the Governor's signature it would have brought the registration of births, marriages, and deaths under the operation of the Penal Code, and consequently increased our power in compelling the observance of the law. This amendment to the Code should be again introduced this coming session of the Legislature, as it is of the utmost importance that your Board be enabled under the law to enforce the provisions for the collection of the vital statistics of the State. We would, however, again suggest that the word "knowingly" be substituted in the Act for the word "willfully," which, as before stated, makes conviction almost an impossibility. We were, however, very much gratified in obtaining what legislation we did, as it evinced a desire upon the part of the Legislature to acquiesce in the request of your Board for a change in our health laws, and an appreciation of the fact that your Board was working in the interest of the State, and not for individual benefit.

SANITARY INSPECTOR.

In the latter part of the session a bill was introduced by our member, Senator J. M. Briceland, providing for the appointment of a State Sanitary Inspector, whose duties, in part, should consist in visiting all portions of the State wherever or whenever contagious or infectious disease was reported. To visit and inspect periodically our southern border along the Mexican line, or other parts of the State likely to be the inlet of contagious disease. This bill was introduced so late in the session that it was an utter impossibility to procure the necessary formalities before it could become law. The appointment of such an officer seems a necessary adjunct to the State Board of Health in the best interests of the State. His duties, in addition to the above, would embrace a general diffusion of sanitary knowledge among those who, from carelessness or indifference, allow preventable disease to progress unchecked. His services would be invaluable in visiting each town having the necessary qualifications in population for an organized Board of Health, or having a Health Officer therein. He should also be prepared to give short practical lectures upon public and private hygiene; inspect the water supply, the disposal of garbage, the sewerage and drainage of every place visited. He should also visit and inspect the jails, court houses, churches, and places of amusement, regarding their ventilation, heating,

etc., in connection with all other matters appertaining to the sanitary welfare of the people. He should also be prepared to test the milk supply, to see that the animals supplying it were healthy, and the dairies kept in that state of cleanliness that would insure, as far as possible, freedom from contamination by decomposing filth.

Our sanitary progress would proceed with more rapidity if we had such an officer, one who was a sanitarian from conviction, and one who would take an interest in carrying his convictions to the people interested. A few years of missionary work of this kind would make such a lasting impression by the good accomplished, by the improvement in the sanitary condition of the places under supervision, and by the decreased mortality, that thereafter but little trouble would be experienced in establishing cordial relations and coöperation with the State Board of Health, and be accompanied by such an advancement in sanitary science throughout the State, that we might claim a prominent place among those States that are noted for the watchful care bestowed upon the preservation of the public health.

STATE VETERINARIAN.

Another bill was introduced into the Senate, providing for the appointment of a State Veterinarian, which passed both Houses, but was refused signature by the Governor, as the bill provided that the appointment of the Veterinarian should devolve upon the State Board of Health as the proper officers to determine the qualification of the applicants for the position, and their ability to make the necessary pathological and microscopical investigations required by the bill. This bill would have been of great benefit to the State, as it gave the appointee the power of inspecting all cattle, or other animals supposed to be diseased, and made it his duty to visit any locality where such diseased animals were reported to exist. It also made it the duty of all persons knowing, or having cause to suspect the presence of contagious disease, to notify the State Board of Health of the existence of such disease, and upon its verification by the State Veterinarian, he was authorized to quarantine such animals, and call upon Sheriffs, Constables, and peace officers to aid and assist him in so doing. At the same time, the following bill was introduced to regulate quarantine:

AN ACT

To regulate quarantine, and the admission of horses, cattle, sheep, and swine into the State of California from infected districts.

[Approved March 19, 1889.]

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. The State Board of Health shall be empowered to declare quarantine against the entry of domestic animals from any State or Territory, or any foreign port or country, in which contagious or infectious diseases are known to exist; said infected parts to be named in the proclamation.

SEC. 2. All domestic animals coming into the State from districts mentioned in section one must be required to enter the State at such points only as the State Board of Health may by proclamation determine, and designate where they must be unloaded for inspection.

SEC. 3. All owners of domestic animals coming into this State from localities quarantined against will be required to furnish the following evidence that such animals are free from disease:

First—The affidavit of two disinterested parties, who have known such animals for a period of four months prior to the date of shipment, that they have been healthy, and

exposed to no contagious disease, and that no contagious disease is known or believed to exist in the district or country from which they came.

Second—The certificate of the County Clerk of the county, that persons making such affidavit are responsible and reputable citizens of the county.

Third—The affidavit of the owner or person in charge, made at the point of entry, that such domestic animals are the identical animals described in the foregoing affidavits, and that shipment has been direct, and without unloading, except for food and water, and in cleansed and disinfected cars.

SEC. 4. Owners or persons in charge of domestic animals from localities not named in such proclamation must certify, under oath, that such domestic animals have been kept in one place for a period of four months immediately preceding the date of shipment (giving the name of the town and county and State, Territory, or country), and have not been exposed to any contagious disease for a period of three months prior to the date of shipment.

SEC. 5. All the foregoing evidence to be submitted to the State Veterinarian, or an authorized Inspector of the State, when permits for shipment in this State shall be issued.

SEC. 6. Dealers' calves gathered in quarantined States or Territories will be quarantined at the points of entry.

SEC. 7. Domestic animals not receiving permits for shipment, and retained in quarantine, will be held at the owner's risk and expense.

SEC. 8. All domestic animals arriving at points of entry shall be inspected free of charge to the owner.

SEC. 9. No railway company doing business in this State shall receive for shipment into this State any domestic animals, unless accompanied by a permit signed by an authorized Inspector.

SEC. 10. No cattle shall enter this State from Texas, New Mexico, or Mexico for grazing purposes during the months of March, April, May, June, July, August, September, October, and November in each year.

SEC. 11. All cattle from those parts mentioned in section ten entering this State during the months mentioned in section ten, and intended for butchering purposes, shall pass from the point of entry into the slaughter house yard, which yard shall be specially constructed and isolated for the purpose of receiving such stock. The stock shall be unshipped in said yard direct from the cars running into the yards for that purpose.

SEC. 12. Said cattle shall, moreover, be shipped in specially constructed cars, which will prevent the dropping of manure and urine on the track during transit, and after unshipping such cattle the cars shall be thoroughly disinfected with carbolic white-wash.

SEC. 13. All cattle entering this State for the purposes mentioned in section eleven shall only be unshipped between the point of entry and destination at places set apart by the State Board of Health in its proclamation; and no native stock shall be allowed at any time to enter said places; said places shall be, moreover, thoroughly disinfected in such manner as the State Board of Health may direct.

SEC. 14. Any person or persons, corporations, or firms, who shall violate any of the provisions of this Act, shall be liable for all damages sustained and a fine of one thousand dollars, to be recovered in any Court of competent jurisdiction, on account of any contagious or infectious disease being communicated from any diseased animal to any other animal in the neighborhood, or along the line of such transportation of such diseased animals into or through this State, or from one part thereof to another; and the existence or presence of such contagious or infectious disease among the native cattle of this State on the same ranch with, or in the vicinity of any such diseased animals, or along the line or route over which they were transported, shall be prima facie evidence that the same were affected with such disease at the time of being so removed or transported, and communicated it to such native domestic animals so affected therewith.

SEC. 15. The words "domestic animals" whenever used in this Act shall be construed to mean and include horses, mules, asses, cattle, sheep, goats, and swine.

SEC. 16. The State Board of Health is hereby authorized to appoint one Inspector for each of the points of entry by railroad communication into this State, who shall reside at such point as may be designated by the State Board of Health, and shall receive such compensation for actual services as may be determined by said Board, not to exceed one hundred dollars per month; such compensation to be paid out of any moneys in the State Treasury not otherwise appropriated, upon the warrants of the Controller of State drawn upon the certificate of the State Board of Health allowing the same.

SEC. 17. This Act shall take effect immediately.

This bill passed the Senate, and was supposed to have passed the Assembly. It was transmitted to the Governor, received his approval, and was placed among the statutes of the State. After the Legislature adjourned, it was discovered that this bill had not legally passed the Assembly, and consequently was null and void; and although it is printed among the laws of the land, it cannot be enforced; consequently the State is still without any official means of either detecting diseased

animals or taking measures to arrest the spread of contagious diseases among animals if detected. This omission ought to be rectified at the next meeting of the Legislature, as splenic fever is quite common in this State, and tuberculosis is known to exist in many of our dairies. A State Veterinarian and a State Sanitary Inspector are necessary adjuncts to the State Board of Health.

QUARANTINE.

Upon the subject of quarantine as applied to our seaports, your Secretary has to report the following letter from Supervising Surgeon-General Hamilton, which shows that work is in contemplation upon the grounds in San Francisco Bay and San Diego. Since the receipt of this letter, work has been begun in San Francisco Bay, and it is hoped that the station will be prepared for service before the completion of the present year:

TREASURY DEPARTMENT, OFFICE OF THE SUPERVISING SURGEON-GENERAL,
U. S. MARINE HOSPITAL SERVICE, WASHINGTON, March 7, 1890.

Dr. G. G. TYRRELL, Secretary State Board of Health, Sacramento, Cal.:

DEAR SIR: In reply to your letter of the twenty-fourth ultimo, I have to inform you that plans and specifications for the United States quarantine plant, at Angel Island, San Francisco Bay, have been completed, and contract has been made by the Supervising Architect of the Treasury for the construction of necessary buildings, wharf, etc., which will be begun at once. With regard to San Diego, I have to state that there has been unavoidable delay in obtaining a proper site, caused by the refusal of the War Department to transfer to this Bureau the portions of the Government reservations which had been selected by a Board appointed for that purpose.

A good site, however, has recently been acquired by purchase, and pending preparations of plans, and making of contract for the erection of buildings, a medical officer is kept on duty continuously, and a quarantine inspection is constantly maintained. Should emergency arise, temporary measures, such as erection of tent hospitals, temporary detention, and disinfecting apparatus, will be provided.

The contract provides for an expenditure of over \$112,000 for buildings and appliances alone.

The boarding vessels required for San Francisco and San Diego quarantines must be built on the Pacific Coast, and must be provided for by a special appropriation of Congress; and the coöperation of your Board to this end is desirable.

Respectfully yours,

JOHN B. HAMILTON,
Supervising Surgeon-General, M. H. S.

In case of the incursion of infectious disease, such as smallpox, yellow fever, or cholera, by way of Arizona or Mexico, it would be necessary for our Board to select a quarantine ground in the valley of the Rio Grande, or in its vicinity, which would be accessible to water, away from human habitations, and yet within easy communication by railway. Such a location can, in the opinion of Dr. Herrick, be found in a place called Carbazon, ninety-three miles east of Los Angeles, as will be seen in Dr. Herrick's report introduced later. Our State, since the last Biennial Report, has been singularly free from epidemic disease, and the endemic diseases that prevailed were generally of a mild character, and without any remarkable fatality.

SMALLPOX.

A few cases of smallpox appeared in California during the fiscal year of 1888; one case was reported in July. In August, some fourteen cases were reported in hospital in San Francisco, two in Oakland, and one in Redding, Shasta County. In September, San Francisco reported twenty-

four cases in hospital, Stockton one case, one in Livermore, and one in Elk Grove. In October a case appeared in Sacramento; the disease had not increased in San Francisco. In November, there were thirteen cases in San Francisco, in Santa Rosa there were four cases reported, and in Merced there were five cases reported.

In connection with these cases it might be said that at the first outbreak a difference of opinion existed among the medical men there as to whether the disease was smallpox or varicella. To settle the difficulty, I requested our fellow-member, Dr. C. A. Ruggles, who has had great experience in the disease, to visit Merced and report, which he has done, as follows:

During the last days of November, 1888, I received a telegram from Dr. Tyrrell, Secretary of State Board of Health, requesting me, at my earliest convenience, to go to Merced and investigate a suspicious case of sickness. On the following day I took train, arriving at Merced at half-past 2 o'clock p. m. I put myself in communication with Dr. G. P. Lee, the attending physician. I much regretted the unavoidable absence of Dr. E. S. O'Brien, who had seen the suspected case in consultation with Dr. Lee; but my limited time would not permit my awaiting the return of Dr. O'Brien, so we repaired to the home of the patient. I found a lady advanced in years, a relative and neighbor to a child that died but a short time before, afflicted with a "breaking out" on the skin. She had been a constant attendant on the deceased and other members of the family who had been similarly affected. Having been assured by many that there was no occasion for any suspicion, I determined to be exceedingly careful in my investigation. Upon bringing a good light to bear upon the eruption on the old lady, I found the unmistakable, genuine marks of variola in the "drying up" stage, and I unhesitatingly pronounced it a case of varioloid, as she had been successfully vaccinated in years ago, and that she had probably contracted the disease from the child who had died, and had been buried publicly only a few days before, with the attendance usual in a country town of the size of Merced. I gave a written opinion to the District Attorney, J. W. Breckenridge, advising that a special meeting of the Board of Supervisors be called, that a Board of Health be appointed with full power of action, that a rigid quarantine of the affected person be enforced, that general vaccination be performed, as I much feared that the error in diagnosis might be very serious in its effect. I was very well satisfied where this lady contracted the disease, but where the child and the others previously affected contracted it, I am not able to say.

With some of the county officials and Dr. Lee and Dr. O'Brien, who had returned to town, I made a rigid examination of Chinatown, as it was supposed there might be some secreted cases existing there. I found nothing on which to base a supposition where the first cases originated. I was satisfied that all to whom I had expressed my opinion did not believe that there had been a serious error of diagnosis, and it was fortunate for my peace of mind that I did not know anything of the newspaper war that was waged against my opinion, and the action of the Board of Supervisors based upon that opinion. I presume that all the advised precautionary measures were thoroughly carried out. To confirm and verify my opinion, twelve days after my visit I received a telegram from District Attorney Breckenridge requesting me to send a few female nurses to attend smallpox cases. Fortunately I had at my command three faithful, competent, and experienced lady nurses, whom I sent on the following day to the assistance of the Board of Health.

My own personal knowledge of the smallpox at Merced ceases here, and is respectfully reported.

C. A. RUGGLES, M.D.,
Of State Board of Health.

About one week after Dr. Ruggles' visit a controversy had arisen between some of the inhabitants and the doctors, the former doubting the correctness of Dr. Ruggles' opinion, and your Secretary was requested to visit Merced, and definitely settle the matter. Accordingly, I went down, visited all the patients, examined them carefully, and gave a written opinion confirming most fully the conclusions arrived at by Dr. Ruggles, that the disease was smallpox. This seemed to satisfy the controversialists, and renewed sanitary precautions were immediately instituted.

In December, two cases of varioloid appeared in Los Angeles. In Mendocino one case appeared, likewise one in Stockton. In San Francisco there were three or four cases during the month. In January,

1889, there were cases of smallpox still developing. San Francisco had a few; ten were reported in the first part of the month; a case was also reported in Napa County, three new cases in Merced, two cases occurred in Riverside, near San Leandro other cases developed. Your Secretary was also called to Placerville to see a case of well marked confluent smallpox, which was, no doubt, contracted from a case that had died there some time before. A case of varioloid also developed some little distance from the town. In February, the disease began to abate; only one case occurred in San Francisco. In Placerville five cases occurred during the month, one case was reported in Stockton, and one in Truckee. In March, San Francisco reported three cases, and three occurred in Hanford. In April, only one occurred in San Francisco and one in Hanford. In May, three cases occurred in San Francisco, one in Lodi, and one in Stockton. In June, no cases were reported in California.

From this date the disease remained absent from the State until October, 1889, when Dr. Baum, of Placerville, reported two cases of varioloid about seven miles from Placerville. They came from Carson Valley, Nevada. The disease did not extend. In November, one case was reported in Humboldt County. Since then there has been no smallpox in the State. During the month of May, in the present year, alarming accounts were received of the prevalence of smallpox in New Mexico, and along the line of the Southern Pacific and Santa Fe Railways. As these two highways into California were more likely to carry refugees into our State rather than into the East, and as it was impossible to obtain the exact seats or foci of disease from the conflicting reports forwarded, your Board deemed it advisable to appoint an inspector to visit all the infected districts, and take such precautions as he deemed prudent to prevent the carriage of the disease to this State. As our jurisdiction did not extend beyond the borders of California, and as it was important that measures should be adopted outside of the State, your Secretary telegraphed to Surgeon-General Hamilton the fact of smallpox being in New Mexico, and perhaps in Arizona, and asked him to appoint Dr. S. S. Herrick, our Inspector, as Inspector for the United States Government, with power to act. This Surgeon Hamilton promptly did, thus clothing our Inspector with authority to travel through the Territories, and carefully determine what was necessary to confine the ravages of the disease within bounds.

Herewith is appended the official report of Dr. Herrick, which proves that your Board acted with prudent foresight in thus having authoritative information upon the location of smallpox in the Territories, and the precautions which must be adopted if we desire to prevent another visitation of this most unwelcome pestilence:

SAN FRANCISCO, July 15, 1890.

Dr. G. G. TYRRELL, Secretary of the California State Board of Health:

SIR: On May twenty-fourth I received the following notification: "By the authority of the State Board of Health you are hereby appointed Medical Inspector on the line of the southern border of this State, to prevent, as far as possible, the inroad of contagious or infectious diseases from neighboring territory into California."

In compliance therewith I started the following day, and stopped for a few hours at Los Angeles for consultation with Dr. Orme. It was decided first to visit the points where smallpox had been reported to prevail, and make a thorough investigation; then to report and await orders for the proper action. Accordingly, I proceeded to El Paso, satisfying myself by inquiries en route that no smallpox existed on the line of travel.

Arriving at El Paso, May twenty-eighth, I called on Dr. W. M. Yandell, who is the efficient City Physician and Health Officer of that place. He has resided there since 1886, and states that few cases of smallpox had occurred from that time to December, 1889. De-

cember fourteenth the first case was discovered at El Paso, but it had existed earlier at the opposite city of Juarez (Paso del Norte). Between December 14, 1889, and April 11, 1890, when the last case originated, there had been twenty-nine cases, with six deaths. All had been sent promptly to the pesthouse, except a few guarded night and day at home at their own expense. The requirement of vaccination for admission to the public schools is strictly enforced. Besides, I found the sanitary condition of the city remarkably good.

We visited Juarez together and examined the mortuary records at the office of the city Judge. Between October 1, 1889, and May 23, 1890, there had been forty-eight deaths from smallpox, out of a total of two hundred and fourteen from all causes. The number of cases was unknown. The population of El Paso is about eleven thousand, while Juarez is supposed to have nearly the same. The last death from smallpox at Juarez had occurred May 7, 1890.

Anthony Station is on the Santa Fe Railway, twenty miles north of El Paso. May twenty-ninth I stopped long enough to learn that three Mexican children had died there of smallpox, the last one about three weeks previously. How many other cases had occurred was unknown.

Las Cruces is forty-four miles north of El Paso, and has an estimated population of twenty-five hundred, of whom about one third are Americans and two thirds Mexicans. December 20, 1889, a man reached here on horseback from El Paso in the first stage of smallpox, having probably contracted the disease at Juarez. He was visited during his sickness by Mexican women with their infants in arms; for it seems to be the custom of those people to give their children smallpox at the earliest opportunity, instead of resorting to vaccination. From this beginning the disease continued to spread, but did not attract the attention of the authorities till April. As the town is not incorporated, the County Commissioners appointed one of the physicians Health Officer; but the law allows no compensation, and he declined the position. On May first the duty was assumed by a public spirited citizen, at which time there were sixty cases of smallpox. Nearly all were Mexicans, and their funerals were public from the church.

Mr. Booth, the acting Health Officer, could do no more than vaccinate those who were willing, display the yellow flag where the sick resided, and fumigate the houses. No public money was used for any purpose, except to purchase vaccine virus; the bovine supply failed of success in about half the trials. No account of cases or deaths was kept, but Mr. Booth estimated the total number of cases up to May twenty-ninth at one hundred and forty, with one third as many deaths. The total number then known to be sick was sixteen.

Mesilla is two miles from the railroad, and three miles southwest of Las Cruces. It has a population somewhat larger—nearly all Mexicans. Smallpox appeared there in April. I did not visit it at that time, and shall return to it later on. I learned that smallpox attacked the Texan ranchers among the Sacramento Mountains, ninety miles eastward of Las Cruces, in November, 1889, having reached there probably from Juarez.

San Marcial is a railroad town on the west bank of the Rio Grande, one hundred and fifty-one miles north of El Paso. Its population is about seven hundred—all American. In the winter of 1888-89, smallpox reached here from Socorro, and disappeared in April, 1889.

Old San Marcial is about one mile to the southwest, and has a Mexican population of about one hundred and fifty. Within the past six months three or four children have had the smallpox, the last case occurring about a month previous. At San Marcial I was informed that there were then two cases of smallpox at Cañada Alamosa, a Mexican town of about three hundred inhabitants, and about forty-five miles from Engle Station, which is one hundred and thirteen miles north of El Paso; and that some had occurred at San Alvaro, about thirty miles southwest of San Marcial.

Socorro is one hundred and seventy-eight miles north of El Paso, with a population of about one thousand five hundred Americans, and as many Mexicans. It is incorporated, but there is no registration of vital statistics, and no burial permits are required. Smallpox appeared in December, 1887, after an absence of two years. The last case occurred in April, 1890. Of Americans, there have been fifteen cases altogether, with four deaths. The number of Mexican cases was unknown, but conjectured to be at least seventy.

Magdalena is a town of about three hundred inhabitants, at the extremity of a branch railroad, thirty miles west of Socorro. Smallpox reached it in December, 1889, and five cases were known to have occurred. Visiting there later, I learned that there had been no cases for several months.

June twentieth, I learned that there was an American man sick with smallpox at San Antonio, a railway station twelve miles south of Socorro. It is, therefore, apparent that this part of the valley cannot yet claim riddance of the malady. Albuquerque is two hundred and fifty-four miles north of El Paso, and has an estimated population of six thousand, more than nine tenths white. The old town, about one mile and a half westward, has a population of about three thousand Mexicans. Within a radius of two miles there are probably twelve thousand inhabitants. In an interview with several of the medical men, their concurrent testimony was to the effect that smallpox had been almost constantly present among the Mexican inhabitants along this valley since 1861. Among the Americans the cases have been comparatively few. The last within the city limits were in June, 1889; but a month ago two occurred just outside on the south. Within the past year eight or ten cases have occurred at Bernalillo, sixteen miles north; and at Wallace, thirty-six miles north, four railroad people had the smallpox in 1889, besides about twelve others, mostly children.

In order to make the investigation as thorough as practicable, I traveled over the Atlantic and Pacific Railroad to Barstow, and thence by the California Southern to Los Angeles, stopping over night at Gallup, and making inquiries at the important points in New Mexico and Arizona. The most recent occurrence of smallpox was at the coal mines, three miles from Gallup, about eighteen months previously. The Mexican population is mainly found in the valley of the Rio Grande, and smallpox is their familiar and special companion.

While I was at Los Angeles, June seventh, a report of some cases of a suspicious eruption came from Pomona, thirty miles east of Los Angeles, with a request for an investigation by the State Board of Health. By desire of Dr. Orme, I went out the same day, and was taken by Dr. Burr to two Mexican settlements, where the cases occurred, just within the limits of San Bernardino County. Most of them had already recovered, and I saw only one presenting an eruption, which appeared to be varicella, rather than varioloid. Besides, I saw two young children, never vaccinated, in houses where members of the family had recently passed through this eruptive complaint. One of these children had experienced the same trivial eruption; the other had escaped altogether. It was therefore evident that the complaint was nothing more than chicken-pox. On consultation with Dr. Orme and the Secretary of the Board, it was then deemed advisable to return over a portion of the ground already traversed, in order to pursue inquiries at some points previously passed over, and to review the inspection of the principal seats of the disease. I stopped over one day, June thirteenth, at Yuma, where I met Dr. J. H. Taggart, who was inspector of railway trains for the California State Board of Health in 1887. The population of Yuma, Arizona, is about twelve hundred, one third Americans and two thirds Mexicans. The Yuma Indians, to the number of about fifteen hundred, live on the California side of the river, but visit the town in numbers daily. About ten years ago smallpox raged among the Indians along the Colorado, from Yuma to The Needles, but has not prevailed seriously since. At that time the Mojaves first, and the Yumas soon after, were persuaded to try vaccination, and they were so thoroughly convinced of its utility that they have requested its practice ever since.

Stopping over at Benson, Arizona, June fourteenth to fifteenth, I learned from Dr. J. C. Preston the particulars of smallpox there last winter. Early in December a resident returned from a visit to Chihuahua, Mexico, and within three days was attacked with smallpox. His wife and three children, and a neighbor who visited the house, followed in due time, but no more cases occurred. The County Commissioners authorized Dr. Preston to use all necessary measures, and the outbreak was suppressed at an expense of \$700. The population of the town is about three hundred, mostly Americans. This place has been fortunate, considering its exposed situation at the junction of a railway running southward through the Mexican State of Sonora, to have had only these six cases of smallpox in three years, as I was informed.

At Lordsburg, New Mexico, I was informed by Dr. Simpson, June sixteenth, that there had been no smallpox either in the town or at the mining camps within thirty miles for four years.

At Deming, the same day, I was informed that the only case of smallpox for a year was a tramp, who passed through and had the disease at Silver City in December, 1889. I was told by Dr. J. W. Williams, who had just returned from a visit to Hillsborough, that there were then five cases of smallpox in that town, all but one Mexican. Hillsborough is the county seat of Sierra County, eighteen miles from Lake Valley, terminus of a branch line of the Santa Fe Railway from Nutt Station. From Dr. Stovall I learned that there were about sixty cases of smallpox at Corralitos, a Mexican town one hundred and seventy miles south of Deming, which is its nearest railroad point. The disease is supposed to have appeared about the middle of May, but it was probably earlier. Revisiting El Paso, June eighteenth, I learned that a negro man, who had come from Durango, Mexico, had been sent to the pesthouse June second. This was the only case since April twentieth.

At Juarez a death from smallpox had occurred June fifth, the only one since May seventh. Passing through Anthony again, June nineteenth, I was told that another case had been discovered a week before; also, that there were some cases at La Union, a Mexican hamlet seven miles west, across the river. The same day I was again at Las Cruces, and was informed by Mr. Booth that eighty-eight cases had come under his care since May first, all but four Mexicans. Ten were then known to be on the sick list, all Mexicans. Public funerals of smallpox decedents had ceased. According to law, an order had been issued forbidding intercourse with the sick, but it was disregarded, and no prosecutions had been made. This time Mesilla was visited, in company with Dr. B. E. Lane, of Las Cruces, and Dr. C. F. Race, of El Paso. The acting Health Officer stated that smallpox was discovered here about April fifteenth, and sixteen cases were known to be sick. He estimated the number of cases at forty-seven up to date. It is probable, however, that many of moderate severity at both these towns have not come to the knowledge of those whose duty calls them to display the unwelcome yellow flag. In any event, the mortality at Mesilla was very low, as there had only been one death since May thirty-first. While the fatality of smallpox among the Mexicans cannot be determined with any approach to precision, it appears to be less than among Americans who have not been vaccinated. This is explained by the fact that the former have been habituated to the malady for more than three hundred years, and have gradually been gaining tolerance through survival of the fittest, *i. e.*, the most resistant individuals.

Although the aspect of smallpox in the valley of the Rio Grande has been found less threatening than was apprehended, and not calling for any sanitary supervision of pub-

lic traffic at present, it is plain that there is nothing to prevent the epidemic from spreading from Las Cruces and Mesilla to other communities in that region. The territorial law gives municipal authorities ample powers to deal with contagious diseases, but it is fatally defective in declaring that the Health Officers appointed by County Commissioners shall receive no compensation.

The County of Doña Ana has money in the treasury, and the physicians of those two towns properly believe that the laborer is worthy of his hire. The Legislature is not likely to correct the defect, if the doctors accept the duty and work for nothing. There is no probability that the epidemic will die out this season, for there is plenty of the raw material to last for many months, and the return of cold weather is likely to give it renewed vigor. It is now a proper field for a skilled sanitarian, with aptitude for persuading the local authorities to appropriate money to the full extent of their lawful powers, and the citizens to put forth their best efforts with liberal contributions, to the end that the pestilence may be stamped out within the earliest possible time. As New Mexico is still a ward of the National Government, I am of the opinion that it owes a helping hand in the present emergency, and that the State of California has enough interest at stake as a neighbor to warrant its State Board of Health in calling the attention of the proper department to the subject.

While traveling along the Mexican border, I made repeated inquiries about yellow fever, and was glad to learn that there is no apparent danger this season. In the State of Sonora it has been entirely absent since 1885, and no danger was apprehended at El Paso of its introduction by the Mexican Central Railway.

Before returning on the inspection review, I had an opportunity, June tenth, to visit Cabazon and Whitewater Stations, with reference to the selection of a quarantine ground, in the event of danger from yellow fever or smallpox from Mexico. Cabazon is a telegraph station ninety-three miles east of Los Angeles, with an elevation of seventeen hundred and seventy-nine feet above the sea. Water is piped from a cañon on the north to the station, and brought in flumes to a ranch close by. There is only one dwelling house near, and no other buildings available for use; but tents would give adequate shelter in summer, and could be pitched at the flume east of the station, as the prevailing wind is from the west.

Whitewater is one hundred and one miles from Los Angeles, on the border of the desert, with an elevation of about eleven hundred feet. It is simply a section station, without telegraph or water supply, as the creek on the lower ground crosses the track one half a mile east of the station. In my judgment, Cabazon is sufficiently isolated, and in several important respects is preferable to Whitewater as a place of detention. On the whole, it is probably the most eligible point on this line.

Respectfully submitted.

S. S. HERRICK, M.D.,
Special Inspector.

From the foregoing report it is apparent that we will have to keep a continued and close watch upon our southern border during the whole season, which makes it absolutely necessary that our Legislature keep our contagious and infectious disease fund well replenished, as we do not know the day when we may have to institute an extensive quarantine station, with all the necessary paraphernalia which such a proceeding demands. The work of our Inspector was much favored by the courtesy of the Southern Pacific Railway Company, which extended every facility to him to make his inspection thorough and complete. This, however, has always been the policy of this company in its endeavor to protect its passengers from any preventable danger. Its coöperation with our Board has been all that we could desire, placing its trains and its officers at our disposal, whenever we sought its aid in discovering contagious disease, or preventing its entrance into California. This "entente cordiale" between the railway company and our Board enables us, with the least possible delay, to visit any point where danger threatens, and to find ready coöperation in any suggestions we may make looking to the safety of the traveling public and the sanitary welfare of the State.

In this connection, we desire to call the attention of the Board to the serious difficulty which sometimes attends the performance of a public duty by our Health Officers. During the epidemic of smallpox in Los Angeles in the year of 1887-88, when consternation prevailed among the citizens and the most rigid preventive measures were called for, Dr.

Hagan was Health Officer; upon him devolved the duty of isolating patients, establishing quarantine, and taking all measures possible to protect the public from contracting the disease. One of the patients died after removal from a tenement house, and the mother sued the doctor; a verdict was rendered against him for the extraordinary sum of \$7,000. Dr. Hagan, believing that he should not be made to bear this heavy burden, appealed to the Mayor and City Council to relieve him of it. As the whole matter is of great interest to sanitarians and officers of health, we have decided to print the appeal to the City Council, and also Dr. Hagan's petition and statement to the same body, giving the circumstances of the case and his expenses appended. The matter was referred to the City Attorney, who was of the opinion that the city funds could not be paid for this purpose, having been raised for other specific purposes; however, the majority of the Board were in favor of reimbursing Dr. Hagan, and by an unanimous vote agreed to pay the compromise note of \$2,750. This suit and verdict is likely to have a deterrent effect upon Health Officers if placed in a similar situation, owing to the uncertainty of what a jury will do. In this case the evidence did not justify the verdict, as neither negligence nor carelessness were shown, which the instructions of the Court required to be shown before a verdict could be found for the plaintiff. The following was part of the instruction given to the jury by the Court: "If you believe from the evidence that the defendant, whether acting officially or otherwise, acted carelessly or negligently in removing Ida Searles to the hospital, or negligently or carelessly placed her in an unfit or improper place; or, after placing her therein, treated her negligently or carelessly; or if you find, from any act of negligence of the defendant's, her death was caused, you must find a verdict for the plaintiff." The jury in this case was evidently moved more by sympathy than by either law or justice, and the innocent doctor had to suffer accordingly.

To the Mayor and Council of the City of Los Angeles:

GENTLEMEN: We, the undersigned Mayor and Council of said city during the years 1887 and 1888, respectfully represent, that during a portion of said years the city of Los Angeles was afflicted with smallpox. Dr. Hagan was Health Officer during a portion of that time. By his energetic and efficient action, we are satisfied that the city was saved from a terrible and widespread epidemic of that loathsome disease. The Doctor, during the time he was in office, successfully treated about one hundred and thirty cases of smallpox, which were cared for by the city at a heavy expense. We did everything we could, as representatives of the city, to stay the disease, and to make those that were sick as comfortable as possible.

The hospital that belongs to the city was not such an one as would best answer the purpose for which it was used; and we endeavored to remedy the defect, by having another and more suitable hospital built. Our efforts in that direction met with opposition and litigation.

During the epidemic, Dr. Hagan found it necessary, for the safety of the city and community, to remove a young girl, Ida Searles, to the hospital. She had been taken with a very malignant type of the disease; and though everything was done for her that could have been done, she died in about eight days after she was taken sick.

Her mother brought suit against ourselves and Dr. Hagan, and Dr. Cole and Mr. McEvoy, his assistants.

The Court granted a nonsuit as to the Mayor and Council, on the ground that no right of action existed against them—as all their connection with the matter was of a legislative character.

There were two trials in the case, and in both trials verdicts were rendered against Dr. Hagan and his assistants; the first, for \$5,000; the last verdict and judgment being for \$7,000.

As before stated, we had endeavored to have a more suitable hospital erected, but we were enjoined by the Court from doing so; and, it so happened, that in one department of the Court we were under injunction, restraining us from building a better hospital; and about the same time, a jury in another department of the Court rendered a verdict against Dr. Hagan and assistants, for removing Ida Searles to the only one we had.

In cases of this kind, it has always been the custom of cities to save their officers from liabilities incurred in an honest effort to discharge their duty to the city and community, and we respectfully ask that the city now pay the note that Dr. Hagan has been compelled to give, in settling this heavy judgment (amounting to \$2,750) by way of compromise. The doctor has already been put to about \$1,600 in expenses, and has been terribly harassed and worried by the suit.

(Signed:)

W. H. WORKMAN,

Mayor City of Los Angeles, in 1887 and 1888.

And all members of Council of 1887-88.

JUNE 9, 1890.

To the Mayor and City Council, Los Angeles City:

Dr. M. Hagan, formerly Health Officer of the city of Los Angeles, respectfully begs leave to submit:

That during the early part of the year 1888, and while he was acting as such Health Officer, one Ida Searles, aged sixteen years, daughter of Mattie McLaud (formerly Mattie Searles), the wife of J. F. McLaud, was taken down with the smallpox at a tenement house on San Pedro Street, in said city; that he visited the said Ida, and found her suffering with a peculiarly malignant form of the disease in question; and, conceiving such to be his duty, that he removed her to the smallpox hospital in said city, having first obtained the mother's consent to do so. After being so removed, and while still in said hospital, Ida, as from the nature of her attack was inevitable, died.

That thereafter suit was brought in the Superior Court of the county of Los Angeles, State of California, by Mattie McLaud and J. F. McLaud (her said husband) against several of the city officials and Doctors Hagan, Cole, and Mr. McEvoy, the two latter being Dr. Hagan's assistants. The plaintiffs were nonsuited as to the city officials, on the ground that they merely acted in a legislative capacity, thus leaving Doctors Hagan, Cole, and Mr. McEvoy to defend the action.

That a verdict was returned against the said three defendants, and in favor of the plaintiffs, and judgment was awarded thereon for \$5,000, from which an appeal was taken.

That recently the plaintiffs approached Dr. Hagan, with a view to compromising the matter, and a compromise was effected on a basis of \$2,750.

And Dr. Hagan further says:

That he was appointed Health Officer for 1887, and his time expired the last day of December, of that year; but that he was kept by the Board of Health, against his will and protest, to manage smallpox that threatened to break out in the city at the beginning of the year, and was not relieved by his successor until the fifteenth of February, 1888; and that during this interval the said Ida Searles was taken sick and died.

That on the tenth of February, 1887, smallpox broke out in the city of Los Angeles, and rapidly spread in lodging, boarding, and tenement houses.

That on the third of March, 1887, the Board of Health of the city of Los Angeles, advised by the State Board of Health, and in the presence of the Health Officer, Hagan, passed a resolution instructing the Health Officer to carry all persons attacked with smallpox in hotels, boarding, lodging, and tenement houses, to the smallpox hospital; so in moving Ida Searles from a tenement house—where the disease would positively have spread, owing to the close proximity of unprotected persons—he was acting under the positive orders of the city.

The evidence of Mrs. McLaud shows that she went at the request of the Health Officer, without any severe measures being used; and that Dr. Hagan was present, treated them kindly, and after the mother had wrapped Ida up to her own satisfaction, he took another blanket and folded it about the patient, remarking that every care *must* be taken for the comfort of the girl.

An unusual thing, Dr. Hagan put his deputy, Dr. Cole, on the ambulance to see that the driver was careful, and to avoid any accidents.

Dr. Cole, who was employed by the city to treat smallpox cases, visited Ida twice a day, whereas it was his custom to give a smallpox patient but one daily visit.

Dr. Hagan insists that out of one hundred patients he ordered to the smallpox hospital, Ida Searles received more care and special attention than any other one, and yet her friends are the only ones that ever complained.

The Health Officer succeeding Dr. Hagan had smallpox to contend with for six months, and carried every case, numbering one hundred and thirty, to the same smallpox hospital without any repairs, including some of the wealthiest people of the city. Ex-Mayor Bryson's son was taken to the identical room in which Ida Searles died.

The second verdict brought in for the prosecution was \$7,000. The defense appealed to the Supreme Court; and now, almost a year since the compromise of \$2,750, hereinbefore mentioned, has been proposed and accepted, the defendants believing that it would cost that much to follow up the case through the Courts. Dr. Hagan has given his note, at thirty days, to secure the said sum of \$2,750, which note falls due on the day and date above mentioned.

Now, therefore, Dr. Hagan respectfully asks the city of Los Angeles, inasmuch as he was acting for and under the direction of the city authorities, to pay the above note, and relieve him of an unjust burden.

In defending the case Dr. Hagan has already paid out as follows:

Attorney's fees	\$500 00
Stenographer and type-writer's fees	500 00
Printing for Supreme Court	100 00
Witness from Portland, Or., and elsewhere	300 00
Total	\$1,400 00

Respectfully,

M. HAGAN,
Late Health Officer.

DIPHTHERIA.

Since our last Biennial Report, when diphtheria was declared a permanent resident in California, we have had no reason to change our opinion as to the permanency of its habitation. We find at all seasons of the year, and in all parts of the State, reports of its presence here and there; without any startling epidemicity it carries off its victims steadily and unceasingly. To account for this local pertinacity in the disease, we must admit our ignorance of its primary cause. It has been ascribed to a germ which has been demonstrated by Loeffler and others. Prudden, however, in twenty-four cases, in nearly all of which autopsies were obtained, did not find this bacillus of Loeffler in any one of them. On the other hand Roux and Yersin, in a series of experiments, confirm Loeffler's results. They found the bacillus in fifteen cases of diphtheria, and with pure culture were able to reproduce the disease in animals.

However, the consensus of opinion is that the disease is owing to a living germ; that it is an external and not an internal parasite, and that it is a filth disease, inasmuch as the germ can be cultivated in soil contaminated by filth, and in air saturated with emanations from drains and sewers. Its presence in the homes of the rich and prosperous as well as in the cabin of the poor, in the isolated farm house as well as in the crowded city, may be ascribed to the virulence and vitality of the poisonous germ. It is as virulent when dried as when moist, and has been found in a living condition after being frozen for several hours. Unfortunately its presence is not always made known by its virulence.

In July, 1888, diphtheria broke out in the State Insane Asylum in Maine, and in spite of isolation, cleaning, and disinfection, persisted for months, the last case occurring in May, 1889. The disease was introduced into the institution by an attendant just recovering from "simple sore throat," as it was diagnosticated in the absence of medical attendance. This history exemplifies how difficult it is to stamp out the infection of diphtheria under certain circumstances. We would entertain more hope of its banishment from California if we could insure perfect isolation of the patients and their attendants, their immediate disinfection, together with their clothing, the perfect cleansing of all the utensils used by the patient, the thorough cleaning and disinfection of the rooms occupied by those infected, the systematic inspection of the schools, that no children with any kind of sore throat be permitted to associate with their fellow pupils, the positive prohibition of public funerals of those dead of the disease, and the official disinfection of the house from which the corpse was borne. With these precautions we certainly would see the disease very much lessened in frequency, and by the continued exercise of sanitary vigilance, we might hope to banish it altogether in a few years. The reports of the past two years give us five hundred and sixty-eight deaths from diphtheria, and two hundred and sixty-five from croup. Taking both together we have eight

hundred and thirty-three deaths from a wholly preventable disease, if we had only the requisite skill, patience, and perseverance to apply thoroughly the proper remedial measures to arrest it.

Although Prudden believes in the insusceptibility of animals to diphtheria as we know it in man, nevertheless the cases are numerous where animals have contracted a disease not to be distinguished from diphtheria, and likewise children have contracted a similar disease from animals. Dr. Augustus Schefer, writing from Tehachapi, Kern County, last September, reports four cases of diphtheria, the first of which was supposed to have been contracted from a pet cat. Several cats had died on the premises with obstructed respiration; some turkeys became similarly affected. The doctor had one of the chickens which was affected killed, and he found the throat covered with a white membrane, which was readily detached. Subsequently some other children became affected in this neighborhood, and some died. In Sacramento, while in attendance upon a case of diphtheria, we noticed a large pet cat in bed with the sick girl, who was very fond of it. As the child convalesced the cat sickened, and in a few days had such an offensive discharge from its nostrils and mouth that it had to be killed. Upon examination of its throat it was seen to be covered with a thick membranous exudation, which extended into the nose.

In June, 1889, a communication was received from Dr. H. N. Miner, of Colfax, in which he stated that diphtheria had been epidemic in Gold Run, a mining town not very far from Colfax. Since December, 1888, up to the time of writing, there had been twenty-one cases and three deaths. He ascribes the disease to the unsanitary condition of the town. He says: "There are in the town two old reservoirs, and leading from them and passing through the residence portion of the town are several ditches. In the reservoirs and ditches all kinds of organic matter, together with drift and waste wood, has accumulated. Not enough water flows through the reservoirs and ditches at any time to flush them, but sufficient to keep moist the organic matter, which is almost constantly in a decomposing state. People residing in the immediate vicinity of these ditches have been the worst sufferers. Wells are also located near, and in many cases just below the ditches. Owing to the unwillingness of the people to believe in the contagiousness of the disease when it first appeared, fumigation was not practiced, neither have the cases been isolated."

As a result of this folly, we find Dr. Miner again writing, November, 1889: "Diphtheria is again epidemic in Gold Run. There has been twelve cases, several of a malignant type. No united effort have been made to improve the sanitary condition of the town since the disease prevailed in the place nearly a year ago."

As this narrative illustrates most fully the difficulty of stamping out the disease in even small villages, the almost utter impossibility of removing it from larger cities is apparent. In San Francisco, during the latter part of the year 1888 and the earlier months of 1889, diphtheria was quite prevalent. In November, 1888, sixty-two cases were reported, with twenty-two deaths. In February thirty-four cases were reported, with ten deaths. In March only twenty-two cases were reported. April and May showed a further decrease. The disease, however, is endemic; it shows its presence in greater or less numbers

every month, and although all possible precautions are taken to prevent its spread, the germs will be disseminated in some way or other.

SCARLET FEVER.

During the past two years the cases occurring of this disease have been comparatively few in number and mild in character. There has been nothing approaching an epidemic of scarlet fever in any locality. In San Francisco, in the fall of 1888 and the beginning of 1889, up to the present time, there have been sporadic cases of the disease reported, with very limited mortality. Dr. Rattan, Health Officer at Antioch, reported a few cases there in June, 1889. The infection was supposed to have been conveyed from Oakland by a family who was visiting there. From the first case ten subsequent ones developed.

Dr. J. H. McKee had several cases of scarlet fever in Elk Grove, and traced its advent to the following circumstances: It seems that the hired girl's brother had scarlet fever in Sacramento some ten months before she was employed in Elk Grove. Some time after her arrival, four of the children of the house went with this girl to her room to help her unpack her trunk, which they did, and handled, no doubt, the clothes the girl wore when waiting on her brother ten months previous. In a week or ten days after this episode the four children sickened simultaneously with scarlet fever. The baby was not present at the opening of the trunk, and escaped the disease until the other children were convalescent, and then she came down with it. These cases show the necessity of thorough disinfection of all clothing in contact with scarlet fever, as well as the persistence of the infectious principle, months after it is acquired. As this family lived on a ranch several miles from town, and had it not fortunately been traced to its origin by Dr. McKee, it might have been supposed to have arisen *de novo*. We believe that all cases of scarlet fever have their origin from a previous case, and until the avenues of infection are better guarded than at present we must not be at all surprised at the appearance of sporadic cases of scarlet fever that are apparently unaccountable as to their source.

From the very infectious nature of this disease, it should be the rule for every Board of Trustees, Council, or County Supervisors to pass an ordinance compelling the designation of every house having scarlet fever within it by a distinctive flag, so that the public might be warned in time of the danger they were encountering in visiting such a house. It has come to the writer's knowledge of several cases of scarlet fever contracted in visiting houses where the disease was, not knowing the character of the complaint until too late to avoid taking the infection, or carrying it away on their garments to other parties.

MEASLES

Was noticed as present in some parts of California during the past two years. In 1886 the disease was entirely absent from the State for several months, but since that time it has been reported from one place or another every month. The disease has been very mild, and but very few cases of the malignant form, or "black measles," as it is called, have been reported.

Sevestre, at a meeting of the Société des Hôpitaux, says that in order

to prevent the spread of measles its mode of propagation should be understood. Rubeola is very contagious during the period of invasion, continues to be so, but at a less degree during the eruptive period, and ceases at its termination. Transmission is usually effected by the circumambient air. Contagion by a visitor, or by objects which the patient touches, is rare. The contrary takes place in diphtheria, for contaminated objects conserve their contagious powers for years, consequently the prophylaxis of the two affections differ. In the case of measles, the patient should be isolated without delay; but in diphtheria, besides isolation, every object in contact with the patient should be thoroughly disinfected. The great difficulty the sanitarian has to deal with in the prophylaxis of measles is the fact that the disease is communicable many days before the eruption appears, consequently isolation cannot be practically accomplished until the disease has already infected those susceptible to its influence. This peculiarity of the disease has given rise to the question whether the sanitarian is not justified in confining his exertions to the preparation of the environments of the patients, seeing that all insanitary influences are removed from the vicinity of the disease, rather than make fruitless endeavors to isolate an affection that is purely ærobie in its conveyance, and, consequently, impossible to restrict to the person attacked. It has also been argued that measles, being a much milder disease, as a rule, in children than in adults, it is less hazardous to them to permit them to have it when young than to allow them to be exposed to the risks of a more formidable attack when of mature age. This theory has so many advocates that the sanitarian will find it difficult to obtain consent to the isolation of measles. We believe, therefore, that he will be doing his duty if he attends fully to conditions surrounding the patient—to have all sources of filth removed, to see that the air surrounding the patient is pure and abundant, the water used is free from contamination, and the clothing and dwellings of the afflicted are cleaned and disinfected. We believe that the so called "black measles" is the result of constitutional depravity, rather than any peculiarity in type of the disease, as when it is present it seems to confine itself to personality rather than to community, and only attacks those whose system has been enervated by some previous ailment or depressing influences of some kind.

TYPHOID FEVER.

During the past two years, as in the previous two years, this indigenous disease was remarkable for the sporadicity of its character, and the mildness of its type. There seemed to be no tendency to epidemicity in any of the instances where the disease was reported, and most of them could be traced to local causes. The opinion is gradually gaining ground that where typhoid fever exists, the sanitary conditions are bad, and that with proper care of the soil, water, and food, the banishment of typhoid fever from our list of communicable diseases would be an assured fact.

One other point has now been definitely settled, and that is, that the poison of typhoid never generates itself; it always is derived from a previous case. There are very few medical men of any eminence who accept the *de novo* theory, or believe in the spontaneous origin of the disease. We, however, hear and read of these cases every day, because,

in so many instances we cannot trace the effect to its cause. In vain we examine the cellar, and the privy, and the well, hear that the patient has not been exposed, and in no possible way could he catch the disease, therefore it came of itself.

In histories of this kind we cannot exclude the possibilities of infection from some unsuspected source. To do this, we should have the history of those who come and go about the place; the history of the food and water the patient consumed when temporarily away from home, with dozens of other means that possibly might convey the disease germ to his system. In the seemingly difficult task of believing that infection could be conveyed in the absence of any apparent cause, we must not forget the vitality inherent in the disease germ. It has been proven that the bacillus of typhoid can lie dormant for years in a suitable medium, as in a blocked up drain, for instance. It resists cold, as was shown in the epidemic at Wilkesbarre, where the germ lay buried in snow for months. It resists heat up to a certain point; can be carried in the air with the dust of dried excrement, and thus inhaled, so that really the fact of our not finding any obvious cause for the presence of typhoid will not warrant our coming to the conclusion that it can have spontaneous generation; we can, however, be assured that by perfect cleanliness of person and surroundings, with a purified earth, air, and water, we will not be troubled with typhoid fever; it is a fever essentially propagated by filth, and nourished by retention among the living of what experience and common sense teaches us should be removed. It is our mission to inculcate this fact not only among individuals, but endeavor to educate our law makers upon this point, that they may provide the necessary sanitary officers to instruct their constituents in the truths of science.

As Dr. Hill, in his address before the British Medical Association, says:

The sanitarian has still to go forth and try to teach that, without cleanliness, health is impossible, and that though much has been done in this direction, very much indeed still remains to be done. In order to effect the required amelioration, we must in the first place secure, as far as possible, cleanliness and purity of air, water, soil, and food. This is the object to which human effort has been directed more or less from the earliest historic times. The Jewish code of laws clearly provides for such conditions with a precision and detail which strike the modern mind as over-elaborate, while the Romans had a system of sanitation which, as regards its baths, its aqueducts, and its gymnasia, magnificent evidences of which, after more than two thousand years, remain to bear witness of it, excites wonder and admiration. The fact that cleanliness and purity, so much inculcated and practiced thousands of years ago, should have been almost entirely neglected in modern times, is not only incredible but for the indisputable proof of it, but is absolutely humiliating. After the fall of the Roman Empire, Europe lapsed into social conditions of filth which became habitual, and some religious orders actually inculcated it as a virtue. Not only have individuals to be taught, but sanitary authorities also require educating on this point. Much remains to be done in the direction of pure water supplies and the preservation of rivers from pollution; the air is still rendered filthy and injurious by overcrowding, want of ventilation, intra or juxta-mural burial grounds, offensive trades, badly constructed or improperly managed sewers and drains, the keeping of animals near to dwellings, and conservancy systems of refuse disposal, which, by retaining in the midst of the living what Nature distinctly tells us should be instantly removed, violate in the most direct and in the most offensive manner one of her greatest and most legible laws, with the inevitable result of exacting the payment of a frightful penalty for the infraction. The surface of the earth has to be rid of cesspools and surface filth of every kind, whether specific or non-specific, and the highest standard of purity aimed at with never-failing persistency. It is difficult to overestimate the ultimate advantages of such a policy, but we are assured already by past experience that they must be very great to humanity, and will prove the truth of the old dictum that "cleanliness is next to godliness."

The truth of these words is apparent to every one engaged in the conservation of health and the prevention of disease; and when we contemplate the lame excuses and miserable subterfuges resorted to by Boards of Supervisors to avoid the organization of Health Boards or the appointment of Health Officers, it is, as Dr. Hill says, "Not only incredible, but absolutely humiliating."

MORTUARY STATISTICS.

For the fiscal year from June 30, 1888, to June 30, 1889, the number of deaths reported to this Board was eleven thousand two hundred and four, inclusive of four hundred and forty-seven stillbirths. The average population heard from monthly being estimated at seven hundred and four thousand two hundred and sixty-two, would give us an annual death rate of 15.91 per thousand. Owing to our present inability to collect all the deaths in the State, this percentage may be taken as the average yearly mortality.

California, according to the last census, contained a population of one million and a quarter. We therefore may calculate on having received the mortality of nearly two thirds of the State, as the balance of the population is scattered in small towns, villages, mines, and farms. The deaths in them would naturally be somewhat less than in the larger towns and cities; probably two thousand eight hundred, or a fourth more, would exceed the mortality of the unascertained places. The statistics being unreliable, owing to the imperfect working of our registration law, we cannot give an exact percentage of deaths, but are certainly within the mark in putting it at fifteen per thousand for the year 1888-89. We are in hopes that by the time the next biennial report is written our registration laws will be so amended and improved that we will have less difficulty in presenting to your Board the actual death rate of the State, and likewise the number of children born therein. Of the causes of death for that fiscal year we find—

Consumption

To be credited with one thousand seven hundred and twenty-seven deaths, a percentage of fifteen and a half to the total number, which is about the same ratio as in the year 1886-87. Among the one thousand seven hundred and twenty-seven decedents registered, we find seven hundred and forty-four foreigners, four hundred and fifty-one natives of the Atlantic States, three hundred and thirty-four natives of the Pacific States, and one hundred and ninety-eight whose nativity was unknown. It will thus be seen that the very large majority of those dying of consumption came into the State with the disease already in their systems. The deaths of those born in the Pacific States exceeded by a small number those in 1886-87, but not in sufficient number to draw any conclusion as to whether an increase of the complaint among the native born was a fact or a fiction.

Pneumonia.

During the fiscal year 1888-89, the deaths from acute pneumonia numbered seven hundred and ninety, a trifle over 7 per cent of the total mortality. The largest number of deaths occurred in children under one year of age, and in elderly persons over sixty, and nearly double

the number of males to females. The highest mortality was in November, and the lowest in September, and greater in the coast counties than in the interior.

Bronchitis

Caused during the same year three hundred and thirty-seven deaths, eighty-nine being children under five years of age. The highest death rate from this disease occurred in November, December, January, and February, and the largest mortality among those over sixty years of age.

Whooping-Cough.

Among the zymotic diseases of the lungs, we find whooping-cough was fatal in fifty-nine instances during the year. This is a very small mortality, considering that the disease was quite prevalent during the year, and epidemic in many localities.

Diphtheria

Being endemic in the State, caused three hundred and forty-three deaths, two hundred and eighty-three being under twenty years of age. The largest number of deaths occurred in the most densely populated cities, San Francisco having one hundred and fifty deaths, Oakland fifty-two, Los Angeles fifty-nine, and Sacramento only six deaths, although its population is nearly thirty thousand. The valley of the Sacramento being very dry, diphtheria does not seem to flourish as well as in those places where the humidity of the atmosphere is greater. In the interior towns of the State the disease was in sporadic form. The highest mortality of any one month was in November, and the lowest in April.

The public is generally better educated in the contagiousness of this disease than formerly, and now seem to take better precautions to prevent the spread of the disease. Occurring, as it frequently does, in the crowded tenement houses of the city, it is almost a matter of impossibility to effect a perfect isolation of the patients, and consequently we find it propagated among that class of persons to the imminent danger of their wealthier neighbors. It would be a sanitary measure of great importance if a general law was passed making it compulsory to notify the public, by a distinctive sign of warning, placed upon every house containing disease of an infectious or contagious character. I am not aware whether such a law could be made general, but trusting to a municipality to frame such an ordinance, is leaning upon "a broken reed," as you can scarcely find a Board that can unanimously agree upon the necessity of such a course, the majority believing that it would be infringing upon the liberty of the subject; another set thinking that they have no right to make the affliction that has thus visited a family a matter of public declaration; while a still smaller number think the public can take its chances, as it heretofore has done. Sanitary measures are matters of slow growth, and must continue to be until sanitary education can be as generally diffused among the masses as reading, writing, and arithmetic.

Croup

Caused the death of one hundred and thirty-five children, the majority being under ten years of age. As a rule, whenever a case of croup was reported, diphtheria was found in its immediate neighborhood. This fact has been so often remarked that the State Boards of Health of Michigan, Iowa, and some others, have adopted resolutions to the effect that for sanitary purposes, membranous croup shall be considered identical with diphtheria, and that it be included in the list of contagious diseases. Nearly all German authorities take the view of the unity of croup and diphtheria. We think it unquestionable, however, that there are cases of membranous croup which have no etiological relationship to diphtheria, but as we have no trustworthy means of diagnosing these cases from those of diphtheria, the safer course for us to pursue is to consider them diphtheritic, and surround them with all the precautions we would use if we knew them to be of diphtheritic origin.

Scarlet Fever.

The deaths from scarlet fever were, during the year, reported as thirty-eight, which indicates how mild the disease was and how little fatality it produced. Nearly all these deaths occurred in children under ten years of age.

Measles,

During the year 1889, caused but eleven deaths among those reported to this Board, all but one in children under five years of age. The disease was reported in many places throughout the State during the year, but in such a mild form that death was rarely reported, except from some secondary cause, as bronchitis or pneumonia.

Cholera Infantum

Caused two hundred and thirty-three deaths. Heat being the most potent factor in the production of this disease, we find it commencing its ravages in April, with fifteen deaths; May and June they had increased to twenty-one; July, to forty-nine; August, to thirty; September, to thirty-three; October, to thirty-two, and then dropped to fifteen in November, and three in December. It will be observed that the highest mortality was in July, August, September, and October, at which time the earth had attained its maximum heat, which, perhaps, may tend to confirm the conclusion of Ballard, that the temperature of the soil is the key to its etiology; and that summer diarrhoea does not begin until the temperature of the soil, at the depth of four feet, has risen to 56 degrees Fahrenheit (13.36 degrees Centigrade). He considers a porous soil as a better medium for bacterial growth, as retaining more moisture. Hence, towns so situated are more likely to have diarrhoeal diseases prevalent. Other authorities have found no constant relation between a high average temperature and the number of fatal cases. In this State we do find the temperature an important element in the production and the fatality of the disease, and we further find that when moisture is added to the heat the disease is increased in frequency and fatality.

Diarrhœa and Dysentery

Caused, including *Cholera Morbus*, one hundred and seventy-one deaths. It prevailed, to a greater or less extent, in every part of the State, but not in an epidemic form. The greatest mortality occurred in May, June, September, and October. In July and August the death rate was very small, although these months are usually most prolific of these diseases. We also find that the majority of the deaths were confined to children under five years of age, over one hundred deaths being recorded as occurring thus early in life. From five to ten years, there were only two deaths reported; from ten to twenty years, no death was recorded from these diseases. As we approach the decline of life the mortality increases, thirteen being recorded as over sixty years of age.

Typhoid Fever

Caused three hundred and fifty-two deaths, which were so reported. This would not comprise the total mortality of this disease throughout the State, as the returns are so incomplete. It may, however, be taken as a fair basis of nearly two thirds of the State, and must indicate that for the year the prevalence of the disease was under the average.

There were seventeen deaths from *Typho-malarial Fever*, which may be added to those from typhoid fever, as the distinctive difference between the two is yet a matter which has not been satisfactorily demonstrated. We believe that the drift of opinion among the most observant physicians on this coast is in favor of the unity of the diseases, the differentiation being more in the objective symptoms than difference in type. The largest number of deaths were in the months of September, October, November, and December, when they averaged thirty-eight each. For the year the average was twenty-eight and a half per month. This would seem to indicate a local cause for this effect, rather than any general condition dependent upon seasonal or meteorological changes.

Cerebro-Spinal Fever.

We find that in the fiscal year 1888-9 there were only eighty-nine deaths recorded from this disease, and about equally divided between the sexes; fifty-one of these decedents were reported as under five years of age, which casts a doubt upon the correctness of the diagnoses of these cases. Twenty-five deaths were recorded as under thirty years of age, and six from thirty to fifty years old. Some of these cases were reported as presenting all the characteristics of cerebro-spinal meningitis, but in no instance was there any tendency to the spread of the disease.

Meningitis.

Under this heading we find recorded two hundred and fifty-three deaths. Of these, one hundred and sixty-five were under five years of age, fifty-one were under thirty years, and twenty-three over that age. This classification includes those with tubercular diseases, as well as the purely inflammatory class. No deduction can be drawn of their relative frequency, except by consideration of the age of those reported.

It will be thus seen by your Board that this imperfect resumé of the deaths during the fiscal year indicate a very favorable condition of the public health. The zymotic diseases were mild in character, were

nowhere extensively epidemic, and there were only eleven deaths from smallpox within the State.

REVIEW OF THE FISCAL YEAR 1889-90.

We find the number of deaths for the fiscal year recorded as thirteen thousand and thirty-four, which is an apparently large increase over the deaths reported the previous year. This can be accounted for by bearing in mind that the law forbidding the burial of any body without permission was being brought into practical observance, consequently more deaths were reported than ever before. We are still very deficient in our mortality returns, as the difficulty of getting persons to obey the law where no health organization exists is very great. We believe, however, that we have succeeded in getting three fourths of the total mortality, which would leave us about thirty-two hundred and fifty odd deaths to hear of, so that we may fairly estimate the total mortality of the State, in round numbers, to be sixteen thousand three hundred. Our population being one million two hundred and fifty thousand, the percentage of deaths for the year would be 13.3+ per thousand, which would be quite a decrease from the estimation of the preceding year, and shows a remarkably healthy condition of the public health throughout the State, which we believe to be true, as all our correspondents are agreed that the past year has exhibited greater freedom from disease than ever before known.

The average amount of sickness has also been less than usual, and no epidemic, except influenza, has been noted in any locality. Influenza made its appearance in the latter part of November, and became quite prevalent in December, 1889. In January, 1890, it was epidemic throughout the State, but while so extensively disseminated, nevertheless it was mild and without fatality, except when it was the precursor of acute pneumonia or acute bronchitis; in these cases a fatal termination was often had. In February the disease began to abate, and by March was only mentioned here and there by our correspondents. The marked feature of the epidemic was, as usual, the great debility which accompanied the disease. Its power of producing prostration was very great, and many persons were months in recovering from its debilitating effects.

Of the diseases producing the maximum of deaths, we class

CONSUMPTION,

Which caused twenty-one hundred and forty-two deaths. Of these eight hundred and seventy occurred between June 30, 1889, and December 31, 1889, while between the latter date and June 30, 1890, twelve hundred and seventy-two deaths are recorded. This would seem to indicate that late winter and early spring months were the most fatal to consumptives. The average monthly death rate from June to December averaged one hundred and forty-five, while from December to June the monthly average was two hundred and twelve, being a difference of four hundred and two in favor of the fall and early winter months. The deaths reported for the fiscal year 1889-90 exceed in number any yet recorded by this Board. Whether this is owing to the increased number of precincts heard from, or increased immigration to the State of those

suffering from the disease, or the spread of the disease within the State from contagion, we have as yet no means of ascertaining.

The larger number of deaths occurred in San Francisco, it being the center of the great hospital system of the State, towards which all the poor, needy, and afflicted make their way in hope of relief, or in expectation of death if no relief can be afforded them.

Only five hundred and twenty-one died that were natives of the Pacific Slope, one thousand four hundred and ninety-one being immigrants from the Atlantic States and foreigners; forty died whose birth-place was unknown.

From the number of decedents registered from the Atlantic States and foreigners, we infer that our increased mortality from consumption was among those who sought our shores in hope of regaining their health.

PNEUMONIA

Shows also a large increase in the death rate for the past year, the number being one thousand one hundred and twenty-four, against seven hundred and ninety the preceding year. This, no doubt, was owing to the prevalence of influenza, as we found that during its absence the first half of the year the deaths were only three hundred and fifteen, and this included November and December, when influenza was beginning in the State; whereas, from December to June, which is inclusive of the worst part of the epidemic, the deaths from pneumonia rose to eight hundred and nine. We may, therefore, fairly charge the epidemic influence of *la grippe* with predisposing to pneumonia in a very well marked degree. Pneumonia was, however, not epidemic in any part of the State, but prevailed extensively along the coast counties and in the higher altitudes.

BRONCHITIS

Also showed the presence of influenza by an increased mortality, three hundred and eighty-seven deaths being ascribed to it. Of these, as in pneumonia, the greater number occurred between December and June. We find that the deaths among infants under five years of age numbered one hundred and seventy-four, while between forty and sixty years and over the deaths were one hundred and seventy-five, showing how prevalent and fatal the disease was among those that had turned the meridian of life.

DIPHTHERIA AND CROUP.

During the fiscal year 1889-90, the deaths from diphtheria numbered two hundred and twenty-five, which, added to one hundred and thirty from membranous croup, makes the sum total from these twin diseases three hundred and fifty-five, which is about one hundred and twenty-three less than the preceding year. These diseases were not very prevalent, no epidemic of them being reported. There is no doubt the mortality from diphtheria could be very much lessened if the public appreciated the importance of isolation, disinfection, and fumigation wherever these diseases exist. Dr. J. Renon, in a recent publication on diphtheria, regards it as being at first a local disease, afterwards becoming general; although Bretonneau and Trousseau inclined to the same opinion, it has not been generally accepted by the profession. However,

it is a point of wisdom to accept the theory so advanced by so recent a writer, as it can do no harm, and by prompt local treatment of the diphtheritic patch we may prevent the disease from becoming general.

Although the discovery of the contagion of diphtheria is not as yet satisfactorily demonstrated, there can be no question but that such a contagion exists; that it is propagated from the sick to the sound, not only by direct contact, but through a space which, according to Dr. Lancry, is very limited. Dr. Renon considers that the diphtheria microbe is developed in the soil, and is carried therefrom into the atmosphere, from which it is deposited on the surface of things—clothes, furniture, the human body, etc. It is thus seen how much the spread of diphtheria depends upon the care taken of those affected. Prompt measures taken with the first case may save a community from a severe epidemic of the disease; and proper sanitary care of the soil and surroundings of the dwellings may prevent the development of the microbe.

WHOOPING-COUGH,

Although extensively prevalent in many parts of the State, caused but fifty deaths, which is a decrease from the previous year. The disease reported was of a mild character, and spread very slowly.

SCARLET FEVER

Was noticed in sporadic form throughout the State. It was of a mild type, without tendency to become epidemic. It caused only thirty-five deaths, which is convincing evidence of the mildness of the disease. The largest number of deaths was in October, November, January, and May, twenty of the decedents being under five years of age.

MEASLES

Was almost entirely absent from the State until the fall of 1889, when one death occurred in San Francisco in August. No other death was reported until January, 1890, when the disease became prevalent in San Francisco; from that time until June 30, 1890, thirty-nine deaths were reported from it, thirty-two of them being children under five years of age. The prevalence of the disease since January has been observed in many parts of the State, but the type has been very mild, and the number of adults attacked was limited. The most fatal complication observed was capillary bronchitis in children of tender years, which will account for the mortality being chiefly confined to this class of patients.

SMALLPOX,

We are happy to say, was entirely absent from the State during the fiscal year, and we hope, by the operation of the law making vaccination compulsory upon all children entering the public schools, to throw such a safeguard over the entire State that such a disgraceful thing as an epidemic of smallpox will never again be experienced in California. Of course, this will depend upon the completeness with which the law is carried out. If School Trustees, through indolence or ignorance, neglect their duty and permit the law to be evaded, then can we look to

no such immunity from disease; but if the guardians of our public school system do their duty honestly and completely, we need not fear an invasion of smallpox extending much beyond its seat of commencement.

CHOLERA INFANTUM

Caused one hundred and eighty-three deaths, all but one being under five years of age. The greatest mortality was from June to November, and the largest mortality of any one month was June, 1890, when fifty-one deaths were reported. There were several very warm days in June, and it was noticed that whenever a warm wave came down the valleys, the summer diarrhoea of children immediately increased in frequency in those places.

DIARRHŒA AND DYSENTERY,

Although quite prevalent during the summer months, caused but one hundred and fifty-one deaths. The greatest mortality occurred in September and October. These diseases were of a mild character without any epidemic tendency, and, as a rule, easily controlled by suitable remedies.

TYPHOID FEVER.

The mortality from this disease was almost the same as for the previous year, three hundred and fifty being the number. In 1888-89 it was three hundred and fifty-two. This is quite a small mortality when we consider the number of precincts heard from. If to these deaths we add twenty deaths attributed to *typho-malarial fever*, we have an aggregate of three hundred and seventy deaths from these diseases. The largest number of deaths occurred during the winter months, from October to January.

REMITTENT AND INTERMITTENT FEVERS

Were reported to have caused forty-three deaths, which is a very limited mortality for paludal fever, and indicates that our types of malarial disease are, as a rule, mild, and without that perniciousness that is so often observed in the fevers of the Southern States.

CEREBRO-SPINAL FEVER

Is credited with one hundred and three deaths. All were sporadic cases, and occurred in different parts of the State. One half of these deaths being in children under five years of age, the correctness of the diagnosis of cerebro-spinal fever is open to some doubt.

MENINGITIS.

Two hundred and sixty-one deaths were reported under the head of meningitis, inclusive of the tubercular variety. One hundred and sixty-five were under five years of age. The probabilities are, therefore, in favor of the presumption that the majority of these were of the tubercular form of disease, although the purely inflammatory form is more frequently found in young children than is generally supposed.

In this partial review of the principal causes of death during the fiscal

year 1889-90, it will be observed that the purely zymotic diseases, so called, were fatal in less than 10 per cent of the total mortality. This indicates that these diseases were of a mild character generally, and much limited in extent.

LEPROSY.

Although no fatal case of leprosy was reported to this Board, your Secretary has been made aware of many cases being recognized in the State from the frequent inquiries made to him as to what disposition the counties harboring them could make for their care or disposal. Of course the only reply possible was to isolate them, and that each county must take care of its own lepers. As a rule these people were surreptitiously shipped to San Francisco, under the belief that that city had a leper hospital, and that it was supported by the State.

In the valuable paper on leprosy contributed to this report by the President, Dr. Orme, it will be seen how leprosy is gradually diffusing itself, and how necessary it is that some means be adopted to arrest its spread. We believe it is the duty of the State to do this, by providing a State institution for the care and treatment of these people, and most respectfully submit to your Board the suggestion of having a bill introduced at the coming session of the Legislature providing for the erection and maintenance of an hospital for lepers, where all those now scattered throughout the different counties could be gathered together and isolated from their fellow men. This would meet with the approval of every citizen who gave the matter a moment's thought, as the amount of tax levied to provide for this institution would not cost each county one tenth of what the provision for the case of a single leper would if he had to be isolated and provided for by the county. There is a case now in one of the southern counties, where the Supervisors had to erect and furnish a small house for his accommodation, provide a man to watch it, lest the inmate might escape quarantine, and feed and take care of both at the county's expense. There is only the one leper, so far as discovered, in the county. It cannot get rid of him, as he is a white man of some standing in the county, and yet he must not be allowed to attend his business or mingle with the public, lest he infect others. This county will send a strenuous advocate of a State Leper Hospital to the next Legislature, and if other parts of the State who have lepers to support will give their earnest aid, this humane and needful object can be obtained.

OUR CORRESPONDENTS.

Our last report showed an increased number of the correspondents to this Board. I am now happy to state that these have still further been augmented by the establishment of so many local Health Officers, whose reports enable us to present to the Legislature this record of what your Board is doing to augment the public health. The information afforded by our correspondents regarding the prevailing diseases in different parts of the State is very valuable. Through them we are enabled to watch the course of disease and ascertain at once any threatened danger by epidemics; they also enable us to determine the probable condition of the public health. From the reports received during the past two years we are confidently enabled to say that two more disastrous years for the welfare of the medical profession never happened in the State. In

the words of many of them, "There was no sickness worth reporting." This, though disheartening to the doctors, speaks well for the healthfulness of the State. We may, as a Board, perhaps take a modicum of credit for this condition of affairs. The establishment of local Boards of Health at its instigation; the appointment of Health Officers; the faithful performance of their duty; their valuable advice in sanitary matters to their constituents; their watchful care to stamp out contagious disease before it got a decent foothold, and the growing belief that sanitary science is not only a matter of public interest but of pecuniary profit, has combined to place our State upon a firm basis of sanitary reform. When our Legislature at its coming session amends our health laws and gives our Board a little more executive power, keeps our contagious disease fund replenished, and evinces the same interest in forwarding the views of the Board as it did during its last session, we may look forward with renewed assurance to our State's prosperity in all that appertains to its public health; and in this connection we cannot conclude this report without calling your attention to the marked aid given to the Board by

THE PRESS.

Without the aid of this magnetic molder of public opinion, your Secretary feels that his efforts in diffusing sanitary knowledge and sanitary requirements among the people, would have been comparatively futile. To its aid we owe in a great measure the success we have attained in an advisory capacity. It has, by its influence and in its columns, sustained us in every proposition for the public good; it has given free and general distribution to the "remarks" made in our "Monthly Circular," and has dealt leniently with us in its criticisms of the short comings necessarily imposed upon us, owing to the imperfect condition of our registration. We have to thank the press for its generous help in having our health laws amended; in having our Government quarantine stations erected; in showing to our legislators the indispensable necessity of having a contagious and infectious disease fund always on hand for the use of the Board whenever necessity arises for its use, and we look forward to its help at the next Legislature in having a State Sanitary Inspector appointed, a leper hospital erected, and, as important as any, a State Veterinary Surgeon appointed to take cognizance of the contagious and infectious diseases of cattle and horses that are now threatening to become epidemic in the State, to the imperilment of the health and lives of our citizens, and the great pecuniary loss of those engaged in the cattle industry. The frequency with which tuberculosis is now found among our dairy cows cannot but cause the utmost alarm among all classes of the community, as it has been indubitably shown that this dreadful disease, so universally fatal, can be communicated to the human family through the milk abstracted from a consumptive animal.

In this connection we would ask the public to read carefully the report of the veterinarian appointed by the Government to look after the cattle disease in this State, which we publish in this volume. It will then be seen that the necessity for the appointment of a State Veterinarian is urgent, and we look forward with confidence to the aid of the press in the efforts to be made by this Board to accomplish this most important

means of preserving our rising generation and the public generally from disease that is wholly preventable by proper legislation.

In concluding this report as the executive officer of the Board, I desire to acknowledge, with thanks, my personal obligations to my fellow members for the valuable assistance they have rendered me in the discharge of my duty, and for the counsel given so cheerfully in every emergency. I also desire to return my personal thanks to the gentlemen who have so generously contributed to this volume some original papers on leprosy, yellow fever, and other matters of sanitary interest to the public. Also, to our efficient and zealous Signal Service Officer, Sergeant Barwick, for his valuable meteorological services, which cannot fail to be interesting to all seeking California as a health resort. The State is indebted to Sergeant Barwick for his valuable report on our climate as a reliable exponent of its varied features and its suitability to all constitutions. We also submit the report of our fellow member, Dr. C. A. Ruggles, appointed by Governor Waterman as a committee of one to visit and report upon the charitable institutions drawing State aid. We also append to this report the expenses of the Board for two years, and also the expenditure for quarantine purposes, vouchers for which will be found on file in the Controller's office. We also append all the reports received from our County Hospitals, which are not as full or complete as they should be. We have likewise added the names and addresses of our correspondents, to whom we are indebted for the means of compiling our mortuary statistics. We also add, as a matter of interest, the *remarks* appended to our monthly circular; giving every month for two years the monthly deaths, the prevailing diseases, and such sanitary remarks as the occasion called for at the time.

All of which is respectfully submitted.

GERRARD G. TYRRELL, M.D.,
Permanent Secretary of the California State Board of Health.

REPORT OF COMMITTEE ON ORPHAN ASYLUMS AND ALMS- HOUSES DRAWING AID FROM THE STATE.

SAN JOAQUIN COUNTY HOSPITAL.

August 1, 1889, I visited the County Hospital of San Joaquin County. I was very courteously received by Mr. Charles Ward, the Superintendent, who afforded me every facility for a full and thorough examination of the institution. The hospital building is wooden, large, and commodious, and well adapted to the purpose intended. The wards are large and well ventilated by transoms, windows, and wall ventilators. The air is only tolerably good, it having too much of what is called "institution smell," owing, I think, to an imperfect system of sewerage. The institution is pleasantly located on the eastern border of the city of Stockton, far enough from the city to avoid the noise and turmoil, and yet easily accessible. The supply of potable water is obtained from deeply bored wells, cased with iron tubing, which effectually shuts off all possible surface contamination from cesspools and drains. It is abundant in quantity and excellent in quality. The building is well protected against fire, being connected by a large main with the city waterworks, and well furnished with hydrants and hose. At the time of my visit, there were seventy persons in the institution over sixty years of age, receiving aid from the State. From a personal interview with them, I find them well clothed, and as happy and contented as could possibly be expected under the circumstances. Upon a very careful and critical examination, the food was found to be of most excellent quality, no better bread to be found anywhere. The beds and bedding were subjected to a very rigid inspection, and were found to be very good, perfectly clean, and very comfortable. The clothing was all sufficient and good. That aristocratic feeling which I noticed last year, that the State patient was superior to the county patient, fostered by being allowed to occupy apartments separate from the county patients, has been effectually dissipated by a thorough commingling of both State and county proteges, so that idea of superiority no longer exists.

The sewerage is very bad. The waste is collected in a cesspool, and in spite of all efforts to prevent it, I am perfectly satisfied that sewer gas does get into the building. I have most earnestly called the attention of the Board of Supervisors to this bad condition of sewers, and am assured that active measures will be immediately instituted for its remedy. Hard work, privation, and in a majority of cases dissipation, have so run down the physical condition of these wards of the State, that the only opportunity of being serviceable to these unfortunates is in palliative rather than curative treatment. The county is very liberal and generous in providing care and attention for these people. The best of medical attendance is procured for them in the appointment of Dr. Gibbons, who visits them daily and as often as required. The total number of inmates is one hundred and four, for whose care one Superintendent and fourteen subordinates are appointed.

STOCKTON INSANE ASYLUM.

On August 1, 1889, I made an official visit to the State Insane Asylum at Stockton. The Superintendent, Dr. Rucker, courteously received me, and afforded me every opportunity for a close and thorough investigation of the institution, personally attending me through the buildings, showing and explaining everything desirable to know. The first thing that forcibly and very unpleasantly impressed itself on my mind was the overcrowded condition of the institution. There are nearly one thousand six hundred patients confined here, when by actual calculation, by measurement of cubic air space, there should be only about one thousand two hundred persons. If legislation is necessary to give a Chinaman five hundred feet of cubic space, surely these unfortunates deserve and should receive like attention. Since my last report, in which it was suggested that the medical staff was too small, an additional physician has been appointed, and arrangements have been made so that all the medical officers shall reside on the grounds, thus removing all possibility of an accident or sudden sickness occurring without access to immediate relief.

By means of the liberal appropriation of the last Legislature, very great and much needed improvements are being perfected. The south wall of the Female Department, that allowed the dampness to percolate through the porous brick, rendering the inner walls and ceiling in such condition as to produce much discomfort, as well as being dangerous to the health of the patients, has been painted with many coats, and that trouble has been averted. The air shafts alluded to in my last report, which terminated in the attic of the female asylum, have been carried through the roof, and the possibility of poisoning the sleepers there with foul air collected from the lower wards has been stopped. Proper representation having been made to the Directors that the extensive piggery maintained by the institution was an intolerable nuisance, endangering the health and disturbing the comfort of the neighbors near the institution, as well as depreciating the value of contiguous property, it was abolished, and by contract the swill is carried away from the building, thus, in that respect at least, very much improving the sanitary condition. The ventilation is tolerably good; in the older buildings it being by doors, windows, and transoms. In those built later it is first class, with all the modern appliances for carrying away bad air, and furnishing fresh and good. The sewerage system, as at the present time arranged, is not good. The plumbing of the older buildings is in a bad condition, much worn, and should be replaced by better and more modern apparatus. Much money has been expended in experimenting on an irrigation sewerage system, without the anticipated success. A contract has been let for constructing an output for all the sewage, which bids fair to be successful. I find the halls, sleeping-rooms, and dining-rooms in excellent state, all scrupulously clean, beds and mattresses good and comfortable, sheets and spreads and pillow cases snowy white, showing great care and attention in that line.

I made a very rigid inspection as to the food supply, visiting the bakery and kitchens. The flour used is extra in quality; the bread made from it is as good as can be found anywhere—sweet, light, and very nice. The meats are furnished by contracts, and are critically inspected by the proper officers before being received. Those that I saw were of

excellent quality in every particular. Upon visiting the kitchens, I found them in as good order as one could wish—neat and clean. The victuals were well cooked and in abundant quantities. A large dairy barn has been constructed, affording accommodations for seventy cows, thus enabling the management to furnish at a very small cost an abundant supply of milk, good and true, so much needed in an institution of this size and character. Large and commodious exercise yards have been constructed, in which the female patients enjoy the fresh air and apparent freedom from restraint. This plan should be continued, as it is productive of much good.

Many of the patients are very expert with the needle, and their work in embroidery is very fine and should be encouraged, as it serves as a means of diverting their minds from their gloomy surroundings into a more pleasant and cheerful channel.

The employment of the patients in workshops should be maintained to as great extent as possible, consistent with safety, as the importance of some properly adopted form of occupation as a means of cure cannot be overestimated, and the evil of the condition of idleness cannot be to fully condemned, many of the patients desiring to work, and take pride in showing willingness and ability to do so.

A close and thorough examination into the mental condition of the large number of persons confined in this institution, forcibly impressed me with the idea that there were more patients here than should be. It appears to me to be necessary that the people should be educated up to the fact that insanity is a disease, and that an insane hospital is a place for the treatment and cure of that disease, and not a receptacle for chronic demented, drunkards, and fools, sent there to avoid care and trouble to friends, and expense to the several counties whence they came. In fact, quite a considerable number of the inmates should be in county almshouses, and rigid legislation should compel a closer examination into their mental condition previous to commitment, so that the institution should not be burdened by those who should be cared for elsewhere.

HOME FOR FEEBLE-MINDED CHILDREN.

August 6, 1889, I visited the Home for Feeble-Minded Children at Santa Clara. As my visit was unexpected, I found everything in its natural daily routine. I was very cordially and courteously received by the Superintendent, Dr. Osborne, and his wife, who is Matron. Every possible facility was given me for a full and thorough examination of the institution and its inmates. There are one hundred and five persons at present here. The too much crowded condition of the building at once presented itself to my judgment. Were it not that probably larger and more commodious buildings will soon be erected, too strong condemnation of the present arrangement could not be uttered. The ventilation is by windows, doors, and transoms, and when the nature of the class of inmates in the building is considered, with the many involuntary accidents continually occurring, I think the system of ventilation is put to a very severe test, and is very successful. The closets were in excellent condition, freely flushed, all well trapped, very clean and free from odor. The dormitories were well ventilated, affording about five hundred cubic feet of air to each occupant, were neatly kept and per-

fectly clean. The bedsteads were of metal, and supplied with straw and hair mattresses; the sheets and pillow cases snowy white; blankets and counterpanes sufficient for comfort. I made a very thorough and severe examination as to the character of the food and the manner of cooking it. The flour is of the very best quality, and the bread made from it cannot be excelled in any place. The meats are of an excellent grade and quality, in sufficient quantity and well cooked.

The clothing of these poor unfortunates was everything that could be desired. The laundry, with its many modern improvements, is very severely taxed on account of the peculiar condition of this class of persons, yet it is all that could be required of it, so much so that I think the cleanliness of the clothing is quite remarkable. My attention was particularly called to the sewerage system of the institution. An imperfect plan of sewerage is worse than none, for by it we are lulled into false security.

The plan here adopted is as perfect and as good in design as the situation of the institution will permit. All the old plumbing had recently been removed from the building, and new work of the latest improved pattern substituted. I find this work to be not only mechanically, but hygienically first class. A Springfield gas machine has been recently set up, and affords not only a better light, but will prove a better safeguard against lamp-explosion and fire. The water supply is good and abundant, being pumped by a six horse-power steam engine into large tanks, thence distributed throughout the buildings and grounds.

The Home has been particularly favored by exemption from any epidemic or contagion. Even the diseases incident to childhood have been notably absent. When we consider the crowded condition of the dormitories, and the inferior, weakened vitalities of the children, too much credit cannot be given to the Superintendent and subordinates for the vigilant enforcement of the strictest cleanliness of person and quarters, by which in a very great measure disease has been averted. I most heartily indorse the sentiments and opinion of the Superintendent, Dr. Osborne, on the subject of epilepsy and the necessity of larger accommodations for this unfortunate class of patients. The most reliable authority says that in fully 60 per cent of all feeble-minded children could be traced the existence of epilepsy itself or as a complication. The epileptic should be segregated, and given close attention and special treatment.

It should be by itself on account of the dreadful, distressing, and frightening influence on those who would be compelled to witness the violent spasms and terrible contortions of the poor sufferer. I speak in the highest terms of commendation of the efforts of Dr. Osborne to thus separate them by placing them, especially at night, in wards or dormitories by themselves, with suitable attendants to look after them. As to the treatment of them from a medical point of view, the good results fully justify the variation from the usual orthodox plan. Too much attention had been paid to medicine and too little to hygiene; trusting too much to bromides, and too little to bathing, massage, and dieting, and the favorable results of this plan adopted by Dr. Osborne, warrant and justify a continuance of the same. It is much hoped that in the new buildings to be erected, especial accommodations, large and extensive, will be provided for the epileptic unfortunate, for there is no class that

deserves a deeper sympathy and a tenderer regard and pity than the epileptic.

INSANE ASYLUM AT AGNEWS.

August 6, 1889, I visited the Insane Asylum at Agnews, Santa Clara County. I regretted the absence of the Acting Superintendent, but was very kindly received by the Steward, who afforded me every facility for a thorough examination of the institution and its surroundings. The supply of water is everything that could be desired, both as to quantity and quality. There are seven flowing artesian wells, capable of supplying more than one million gallons every twenty-four hours. The water is pure and soft, and eminently fitted for cooking, washing, and drinking purposes. By a judicious arrangement of tanks, hydrants, and hose, and a well drilled fire department, the danger from fire is reduced to a minimum. The ventilation of the building is very good, which, with perfect cleanliness, renders the air all that could be desired. In passing from the outdoor air into any of the halls, where were sitting or walking many patients, no odor was perceptible, giving me thereby the proof of perfect ventilation. In bed-rooms, dining-rooms, and everywhere, I tested the efficiency of the method of ventilation and found it good.

The sewage of the institution is conveyed by an eight-inch vitrified pipe to the Guadalupe Creek, a distance of nearly a mile, far enough away not to be troublesome nor dangerous to the asylum, but must be very objectionable to residents in that vicinity. Attention should be given to those objections and a permanent sewer laid to the tide water of the bay, some four miles distant. I was much pleased with the method adopted to prevent any possible return to the building of sewer gas. The main pipe being connected with the tall chimney of the furnace, renders it very easy to dispose of any gas by its being consumed by the intense heat of the chimney.

The Hospital farm, containing two hundred and seventy-six acres, is judiciously divided into tracts for production of hay, fruit, and vegetables, and pasturage for dairy cows. I made a very extended and critical examination into the food supply. It was of first class character. The flour was of the very best quality; the bread was as good as could be made anywhere. The meats were good, freshly supplied in large quantities, and well cooked.

My visit being unannounced and unexpected, everything must have been found as kept in daily routine. I found the corridors, halls, and rooms in all their parts scrupulously clean. The beds and bedding in similar condition. The water-closets, sinks, basins, and urinals were in good, clean condition. It is very unfortunate, that on account of lack of appropriation, there is such an absence of fences and inclosures in which these poor unfortunates can have the very necessary outdoor exercise, as the continued confinement to the wards must necessarily be injurious to their physical as well as mental condition. I am informed that this matter will be remedied as soon as the appropriation is available. Much has been said by the daily press and others in relation to the sanitary condition of the location of this institution. I made a very careful examination of the patients, and diligent inquiry of the medical attendants, as to the presence of malaria and its injurious effects,

but saw nothing and heard nothing to warrant the belief that the location had any bad effects on the inmates.

STATE NORMAL SCHOOL, SAN JOSÉ.

August 7, 1889, I visited the State Normal School at San José. I made a very poor selection as to time for my examination, as it was vacation, and the building was in complete charge of the painters and kalsominers. As thorough an examination as was possible was made as to ventilation, water supply, and sewerage. The ventilation is good, all the modern and approved apparatus being used. The water supply is good in quality and abundant in quantity. It is pumped into tanks and made available for fire purposes as well as drinking use. The lavatories were in an excellent condition. The water-closets clean and tidy, well piped, and trapped. The sewage of the institution is well cared for, the system connecting with that of the city of San José.

STATE NORMAL SCHOOL, LOS ANGELES.

August 13, 1889, accompanied by Dr. H. S. Orme, President of the State Board of Health, I made a visit for sanitary inspection to the State Normal School at Los Angeles. We found everything in most excellent condition. The ventilation is very good. The rooms are large and airy, and well supplied with windows and transoms. The water supply is from the city waterworks, is very good, and abundant. The sewerage system is connected with the system of the city, and is good and effective. The lavatories, water-closets, and urinals are all kept in excellent, clean, and neat condition. As our visit was unannounced and unexpected, of course no opportunity was given for preparation, and I am free to give Principal More credit for having the building in his charge in a most excellent sanitary condition.

STATE NORMAL SCHOOL, CHICO.

August 22, 1889, I visited the State Normal School at Chico. I was here, as elsewhere, cordially received by Principal Allen and Vice-Principal Ritter, who afforded every opportunity for a very thorough and critical examination. It would have been unfair to have subjected this institution to a very rigid inspection, because it was in an unfinished condition—still being in the hands of carpenters, painters, and other mechanics. The building is pleasantly situated just on the outskirts of the town, very easy of access. The style of architecture is pleasing to the eye, and its internal arrangement very commodious and suitable for the uses for which it was designed. When the surrounding grounds are completely arranged, it will show great credit to the State, to the architect, and to the builders. The ventilation is as near perfection as it is possible to get it; it being accomplished by windows, doors, transoms, and air-shafts.

The rooms are all large, well supplied with light and fresh air. The lavatories and water-closets are in most excellent order as relates to piping and trapping, and so arranged that with very little trouble they are capable of being kept in a perfect sanitary condition.

The sewage is collected in a large cesspool situated at a considerable

distance from the building. Abundant arrangements can be made for the escape of sewer gas through shafts extending far above the house. I was much interested, as well as pleased, to find the water-closets in an annex sufficiently separate from the main building as to fulfill all sanitary requirements. From my many visits to the public institutions of the State, I am positively brought to this conclusion, that if this plan of the Normal School building at Chico was generally adopted by architects designing public buildings, much of the unsanitary and disease-producing agents would be very much avoided. The water-closets in many of our public buildings are too intimately related to the main house, and this institution might well serve as an example for future use as to what ought to be done and what can be done. The water supply is from the Holly Waterworks of the town. It is very good as to quality and abundant in quantity. I suggested that large tanks should be maintained, so that in case of an accident to the water-supplying apparatus, a certain amount would always be available.

STATE PRISON AT FOLSOM.

I visited the State Prison at Folsom August 24, 1889, and was very cordially and hospitably received and entertained by the Warden, Hon. Charles Aull. I made a very rigid examination of the prison, in which I was much assisted by Deputy Warden Robinson, who accompanied me and cheerfully showed me all and everything I desired to see. I am free to admit that I was prejudiced against the sanitary condition of this institution, as the oft-repeated assertion had reached my attention that the location of the prison was a very unhealthy one, and I was prepared to find both officers and convicts more or less affected by malaria and its concomitant diseases. Therefore, I was determined to give it the closest scrutiny and most rigid examination, and I freely admit in general terms that quite the contrary is the result of my inspection. The death rate is lower, and excuses from labor on account of sickness are less than in any public institution with which I am acquainted. I made a very close inspection of all the convicts, and I was most agreeably surprised by the total exemptions of sickly appearances. They all seemed hale, hearty, and well fed, and considering all the surrounding circumstances, I might say, happy also. The cells were inspected and were found in a very good condition—perfectly clean and well ventilated. In fact, all of the modern appliances have been utilized to give pure air in liberal quantities to corridors and cells. The raising of the wall four feet, and the addition of a row of apertures near the roof, has done very much to improve the ventilation, and in a measure to account for the healthful condition of the convicts. The fact that in an institution containing over five hundred persons, there is a hospital with only one patient, speaks volumes in favor of the perfect sanitary condition of this prison.

The beds were good and comfortable. The sewerage of the institution is not as good as it should be; but I am assured by the Warden that very soon much improvement will take place in that respect; the present clumsy system will be replaced by smaller pipes of ironstone, with all the proper traps and cut-offs, so that it will become impossible for sewer gas to enter the building.

The water supply is good and abundant, being pumped from the

American River and stored in tanks for distribution through the institution and the grounds.

I made a thorough examination into the food supply and the manner of cooking. The flour was excellent; the bread from it was found to be as good as could be found at any first class hotel. The meats were very good and well cooked.

NAPA INSANE ASYLUM.

August 28, 1889, I made an official visit to Napa, to make a sanitary inspection of the State Insane Asylum. I am under many obligations to Dr. Wilkins, the Superintendent, for the kind and hospitable reception extended to me; also to Dr. Hatch, Assistant Physician, for like courtesy shown by him. Every opportunity was afforded me for a close and rigid examination of the institution and its inmates. The first and very deep impression made on my mind was the wisdom of the Commissioners who selected the site of the Napa Asylum. Its nearness to San Francisco, the easy means of transportation to and from all important localities, the healthfulness of the climate, and the abundant water supply, all demonstrate the sagacity and good judgment of the locators. The institution is situated forty feet above the river, affording an excellent fall for sewage, the whole of which is utilized in an irrigation scheme. I was somewhat prejudiced against the plan of so disposing of the sewage, but upon a very critical examination into all its workings, particularly at the leeward side of the field thus irrigated, I am free to say that my opposition was speedily removed. By judicious purchases of surrounding tracts of land in rear of the institution the watershed has become extensive, and much labor, systematically conducted, has developed a water supply of unexpected quantity and of immense value. By the aid of this great supply of water the sewerage question is very simple. The continuous flushing of the sewer pipes has rendered the poisoning by sewer gas an impossibility. A reservoir for storing water for protection against fire has been constructed at a distance of a quarter of a mile in the rear of the building, and at an elevation equal to that of the clock in the central tower. It has a capacity of two millions of gallons. Large tanks for storing water are placed in each of the towers of the building, and thus the interior as well as the exterior of this immense structure is well provided with fire-extinguishing devices.

I was much surprised by Dr. Wilkins, who gave for my especial benefit an exhibition drill of the fire department attached to the institution. In an incredibly short time after an alarm of fire was turned in two large streams were being played upon the building at a pressure of sixty-five pounds.

As far as the destructive influence of sewer gas and fire are concerned, I think the water supply sufficient to antagonize both. A large dairy is maintained, affording a supply of milk sufficiently large for the institution.

The great supply of water for irrigation purposes allows the raising of much fruit and vegetables. Many fowls are raised, but not enough to supply the great demand for eggs, the monthly consumption being over one thousand dozen.

The food was most closely examined, and found in exceedingly satisfactory condition; the flour is extra in grade, and the bread made from it all that could be wished. The meats are thoroughly inspected before

reception, and what I saw were of first quality. The kitchens were visited, and found to be in excellent condition as to neatness and cleanliness. The ventilation is very good.

The air in halls, corridors, and sleeping-rooms is free from anything unpleasant or unhealthy. The water-closets and urinals are in first class order, the free supply of water rendering it very easy to keep them clean and free from any ammoniacal exhalation. The sleeping-rooms are in first rate order; the beds and mattresses very comfortable, and clothing was clean in every particular. I was much pleased to see so much outdoor exercise, both for physical and mental benefit, the apparent or supposed freedom from restraint doing so much to detract the patient's mind from the gloomy, melancholy surroundings to a more cheerful and pleasant atmosphere. My attention was called to the construction of the two infirmaries in which the insane, otherwise sick patients, can be comfortably kept outside of a ward of noisy patients and disturbing elements. The clothing of the patients, which is furnished by the State, is very good and serviceable. I have arrived at the same conclusion in regard to the crowded condition of this institution, as I did at Stockton. There are many here who ought not to be here, who should either be kept at home by friends, or in the hospitals or almshouses of the counties whence they came.

STATE PRISON AT SAN QUENTIN.

September 12, 1889, I visited the State Prison at San Quentin. On account of the illness of General McComb, the Warden, I was deprived of his valuable assistance in making my examination, but through the kindness of Dr. Durant, the Resident Physician, I was enabled to make my visit very satisfactory, as I was freely shown everything in and around the prison that was desirable or necessary to be informed about. The first thing that impressed my mind was the antiquated appearance of the buildings, and when I consider the fact that for nearly forty years they have been densely populated with all kinds and conditions of humanity, I could but think that, from a sanitary point of view, it would be a good thing for the State if these old affairs could be completely wiped out and replaced with newer and better ones. The greatest care and attention are very necessary to keep them in a decently healthy condition. As to ventilation and sewerage, all is done that can be done to make them efficient. The food is very good; meats and bread I think, from a personal examination, to be of first quality, and well cooked and prepared for the table. The bakery and kitchen were closely inspected, and were found to be in a very satisfactory condition.

It being the dinner hour, I was afforded an opportunity to examine personally each prisoner as he entered the dining-hall. The physical appearance of the majority was very fair, but of the many Mexican and Indian convicts, and not a few of other nationalities, I was convinced that confinement was doing them much injury. They exhibited a pulmonary and scrofulous condition that never does well in close quarters. After a very close and rigid examination of the condition of this class of convicts, and a free and full discussion of the subject with Dr. Durant, I was led to the conviction that in the cause of humanity, persons convicted of crime, previous to a sentence to a State Prison, should be examined as to the existence of any pulmonary disease, or a tendency to

it, by heredity or otherwise, and if such disease did exist or was likely to develop, such person should not be sentenced to San Quentin. I firmly believe that the unsanitary condition of the prison, together with its atmospheric surroundings, does much to develop tubercular disease, if it does not actually produce it. According to the report and experience of Dr. Durant, Mexicans and Indians suffer the most by this disease. They stand confinement very illy; more than one half of the hospital patients are of this class. In fact, the death report shows that for the fiscal year out of thirty-two deaths, fifteen were from consumption and six from scrofula. I cannot better express my convictions on this subject than by quoting the language of Dr. Durant, whose experience is large and extensive and of much value. He says: "The average of deaths is large, much larger than at Folsom, because we have a different element to deal with both in climate and material. While the climate at Folsom is warm and dry and preëminently suited to prolong the life of the consumptive, the moist climate of this place (San Quentin) militates against and causes death in a short time."

The State Board of Health, acting under those suggestions and convictions, has issued a circular letter to the Superior Judges of the State, requesting them in sentencing criminals to put these suggestions into practical effect. Much improvements have been made in arrangement and construction of water-closets by adding ventilators and giving them more effective flushing by an increased amount of water supply; so that the danger of contamination is much lessened. Very necessary improvements have been made in the bathing system, so that now there is no prisoner who does not bathe at least once a week, and some oftener. Great care and attention to cleanliness have rendered the general health fairly good. It is thought that the improved water-closet system has had much to do away, in a great degree at least, with the malaria with which they had to contend.

DEAF AND DUMB AND BLIND INSTITUTION AT BERKELEY.

September 13, 1889, I visited the Deaf and Dumb and Blind Institution at Berkeley. I much regretted that limited time compelled a hasty examination of this magnificent charity. I was cordially received by the Superintendent, Professor Wilkinson, who, with much earnestness and commendable pride, showed me over the buildings and brought me in personal contact with all the officers and scholars. The inspection of the inmates showed them to be in a most gratifying, healthy condition, there being at the time of my visit no sickness in the school. An epidemic of measles had visited the institution, following its usual course, and remaining as long as there was material to support it, but leaving no bad results. The most unfortunate of its results was the interruption of the school duties for over a month.

The water supply of the institution is very deficient, but it is hoped that by successful explorations by tunneling into neighboring hills and liberal appropriations by the Legislature, a water stratum may be struck which will furnish the much needed amount. The ventilation of the buildings, I might say, without exaggeration, is perfect. The most modern and improved appliances are in use, rendering the air as pure as it is possible to be. The school-rooms and dormitories are all large, airy, and well provided with ventilating apparatus. I was much pleased

with the great care and precaution taken, and means provided for escape if a fire should occur. Instead of the usual fire escapes, such as are commonly seen, stone towers at the ends of the dormitories inclose circular stairways of stone, by which, in case of necessity, the pupils may pass out of the building on the upper floors and reach the ground in safety.

A very good arrangement in the girls' dormitory attracted my attention. The dormitory was divided off into alcoves by wooden partitions that did not reach the ceiling, so that while a certain degree of exclusiveness and privacy was maintained, the free and full enjoyment of a plentiful supply of good, fresh air was not interfered with. While each girl had a private sleeping apartment, which she could decorate and make it as home-like as she desired, yet all of them are in the same room. I must heartily approve the plan of the air shafts in the walls, the air being heated and rarified in each shaft by a burning gas jet, by which a continuous current of cold air is maintained and the circulation made perfect. A very rigid examination of the food was made. The flour was extra in quality, the bread nice, light, and excellent. The meats were of the very best kind, with an accompanying amount of vegetables of the season.

The kitchen is a model of neatness and adaptation to its intended purposes. Connected with the institution is a gymnasium, well supplied with Sargents' apparatus. Much good is derived from this branch of exercise in strengthening and developing the physical condition of the pupils. The water-closets, urinals, and lavatories are in first class order, the plumbing in excellent condition, and the whole so arranged as to be separate from the building, thus rendering it almost impossible for sewer gas to enter the house. The system of sewerage is connected with that of the town of Berkeley. The sleeping-rooms are all well supplied with spring and hair mattresses, with blankets and sheets and pillow cases, neat and clean. Quite extensive additional improvements are in progress, and when complete the great usefulness of this grand charity will be much increased. In conclusion I wish to say that, though my duty was simply to inquire into the sanitary condition of the institution, I was much interested by the exhibition of the proficiency in the different exercises, as shown me under direction of Professor Wilkinson, and it affords me much pleasure to say that from a sanitary standpoint it is the model institution of the State, in which every citizen would take pride if visited personally, instead of relying upon official reports of others.

Respectfully submitted.

C. A. RUGGLES, M.D.

REPORT OF DELEGATE DR. C. A. RUGGLES TO NATIONAL CONFERENCE OF STATE BOARDS OF HEALTH.

To the President and members of the State Board of Health of California:

GENTLEMEN: With a high appreciation of the honor conferred upon me by my election to represent you in the National Conference of State Boards of Health, I most respectfully report that I attended the conference held at Nashville, Tenn., May 19, 1890. It met in the Senate chamber of the Capitol building at 10 A. M. Monday. On roll call eighteen States were represented. I am assured that an increased interest is being manifested in these meetings by sanitarians, as this was the most interesting and best attended conference since its inception. After the introductory address by the President, Dr. McCormack, of Kentucky, the regular order of business, which was printed and placed on the desk of each member, was entered upon.

The first proposition was that offered by the State Board of Health of Michigan, relating to the best method of disseminating public health knowledge. Nearly all of the members participated in the discussion. While all admitted the absolute necessity of our annual and biennial reports for historical and statistical references, yet it was generally conceded that the public should be more and better educated in the knowledge of those diseases of contagious nature, such as diphtheria, scarlet fever, and smallpox, both as to their character and manner of transmission, being an endeavor to prevent rather than to cure. The absolute necessity and practicability of thus reaching the masses were ably discussed, and while there was no attempt to disparage or belittle the present means of communication with the public by most State Boards of Health, the general opinion was that more could and ought to be done. Among the many good things suggested, the most feasible was the frequent issuance of small pamphlets or articles on such diseases as might at the time be prevalent. The local press was highly and very deservedly spoken of as an excellent medium through which much important information and instruction could be communicated by members of local Boards of Health in a sanitary column of the daily or weekly papers. Particular stress was placed upon the point of instructing the people how to properly disinfect after the prevalence of any of these contagious diseases. The great good derived from holding sanitary conventions under the charge of the State or local Boards of Health was very impressively mentioned, and a continuance of them advised as a means of promoting and developing popular interest in sanitary matters.

Quite an animated discussion ensued on the Interstate Quarantine law, approved March 28, 1890. Much was said that I think had better not have been said. It was finally concluded that much good judgment would be necessary to prevent confusion and unpleasant collision among State Boards of Health.

Proposition No. 4 was: "What steps should the United States take to

prevent the introduction of leprosy into this country?" At a former conference a special committee, consisting of Drs. Lee, of Pennsylvania, Bryce, of Ontario, Canada, and Hoegh, of Wisconsin, was appointed, to which was referred the general subject of leprosy. Dr. Lee, Chairman of the committee, read a majority report, holding that leprosy is contagious, and declared as a damnable heresy the dictum of the Royal College of Physicians and Surgeons of Great Britain to the opposite effect. Dr. Reeve, of Wisconsin, in the absence of Dr. Hoegh, read a minority report, advancing the opinion that the danger of contagion was very much exaggerated in the majority report, and that it was not sufficiently great to justify resorting to such unnecessarily harsh and severe measures which so disregarded the ordinary rights of diseased individuals.

By permission, I read copious extracts from an extensive and exhaustive paper on the subject, written by Dr. Orme, President of the State Board of Health of California, which confirmed and indorsed the sentiments expressed in the majority report in every particular. Nearly all the members participated in the discussion, and the conclusion finally arrived at was that the State and local Boards of Health could be safely intrusted with the care and regulation of the disease, and that the action of the United States Government in the premises was sufficient.

Proposition No. 5, relating to the use of moisture and sulphur burned for the purpose of disinfection of rooms after the occurrence of diphtheria, scarlet fever, and smallpox, was ably and fully discussed, and the preponderance of opinion was in favor of using a spray of moisture with burning sulphur for the aforesaid purpose. But Dr. Rutherford, delegate from Texas, and State Health Officer, who had had a very extensive opportunity for observation on the Rio Grande in his official attendance on smallpox, expressed his positive and complete want of confidence in the proposed method of disinfection. He relied wholly and entirely upon fire and chlorine gas, obtained very easily and cheaply from black oxide of manganese, common salt, and muriatic or sulphuric acid. To which statement I most cheerfully and emphatically gave my indorsement, founded on an experience of many years as Health Officer of Stockton.

Under the head of miscellaneous business I offered the resolution passed by this Board of Health, in which it was deemed advisable that the conference of State Boards of Health hereafter should hold its annual session in connection with the American Public Health Association. I advocated its adoption to the best of my ability, but, excepting the State of Maine, California was alone in the advocacy of the resolution, the conference declining to agree to it. So, for the present, its meetings will be held simultaneous with the American Medical Association. The policy of such union I very much question. I think an institution of the importance of the National Conference of State Boards of Health, with its grand capabilities of doing much good in sanitary matters, should command respect and interest sufficient to go alone and independent of any and all other institutions. The greater naturally absorbs the lesser, and I was forcibly and painfully made aware of that fact at our May meeting.

There was a disposition to hurry matters, as if a prolonged session might possibly interfere with the interests and welfare of the larger body. The query presented by this Board, "How to prevent the contam-

ination of potable water?" was discussed by many of the delegates, as much as the limited time would allow, and no definite conclusion was arrived at. Dr. Bryce, of Ontario, Canada, read an exceedingly interesting paper, entitled, "Preservation of our Forests as a Sanitary Measure." It elicited much interest, and was referred to a special committee, who reported and recommended, among many other good measures, that this conference respectfully urges upon the Sub-Committee on Forestry, of the Committee on Public Domains, of the Congress of the United States, to pass such laws as shall check the reckless destruction of trees on public lands.

While en route to Nashville, I received, what I deemed very reliable information, that at Las Cruces, near the border line of Arizona, there existed quite an extensive number of cases of smallpox. That the authorities were taking no precautions against the dissemination of the disease. That the Mexican population took no method of avoiding it, or care about spreading it.

As that locality was near the line of railroad going through Arizona by two entrances to California; as Southern California, particularly Los Angeles City and County, had been but a short time previously visited by an epidemic of that disease, which the health authorities believed to have arisen from the same source, which was finally stamped out at an expenditure of much money, and with a very great loss to the business relations of that city, I believed it my duty to notify the State Board of Health of this exact condition of affairs, at the same time advising the placing of Inspectors at border line of Arizona and New Mexico, where the Atlantic and Pacific and Southern Pacific enter Arizona.

As soon as the conference at Nashville adjourned, I hastened to Washington and placed what I believed to be the exact condition of affairs before President Harrison and Surgeon-General Hamilton, U. S. Marine Hospital Service. I received from both gentlemen an assurance that all possible relief and assistance would be immediately rendered.

I wish to make mention of the valuable assistance I received from Congressmen Biggs and Clunie, who accompanied me to visit the President and Surgeon-General, indorsing by their official positions all I might ask for to protect California from a repetition of an invasion of smallpox, which but recently had cost so dearly to eradicate.

Respectfully submitted.

C. A. RUGGLES, M.D.

REPORT OF INSPECTOR OF CATTLE DISEASE IN SOUTHERN CALIFORNIA.

SAN FRANCISCO, December 17, 1888.

DR. G. G. TYRRELL, *Secretary State Board of Health, Sacramento, Cal.:*

In compliance with instructions from you as representative of the State Board of Health, and Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, I proceeded to investigate the outbreak of disease among the cattle of San Diego County, and have the honor to submit the following results of my investigation:

On arrival at San Diego I found that my written orders, etc., from Washington had not yet arrived, so I thought it the better plan to inform myself on the following points:

First—The direction in which the said diseases were supposed to exist.

Second—The ranches on which said cattle were supposed to be dying.

Third—The health and condition of cattle, etc., in San Diego City and its surroundings.

In the course of my inquiries I came in contact with the following gentlemen, and elicited the appended information:

The first gentleman I interviewed was Mr. George Sellwyn, of the firm of Sellwyn & Alison, wholesale butchers. He said: "I have been twenty-three years in this county, and have known of the existence of disease in this county for the past sixteen years, being worse in the last three or four years in the neighborhood of San Diego. Some seasons the disease predominates in one locality more than in another. This year, 1888, the disease has manifested itself, principally, at Warner's Ranch. This ranch is owned by ex-Governor Downey of California." He also stated that cattle brought from the mountains in the interior of San Diego County during the dry season of the year, to San Diego City, or any part of the coast, are, from ten to fifteen days after arrival, subject to disease. The disease is of frequent occurrence, and the cattle are slaughtered and used for consumption. He next described the symptoms of this disease, and the post mortem lesions, both of which correspond to those of anthrax and southern fever, but more particularly the latter.

In the course of conversation I obtained the following information about the hogs: He stated that a disease among hogs made its appearance about two years ago in the pens around the slaughter houses, although the disease has not been so marked, and the mortality less during the last six months. In 1887, Mr. Sellwyn said the mortality reached the enormous number of one thousand head. I asked him if the disease existed at the present moment, and he said he suspected it did. We then drove out to some hog pens near his slaughter house, and I found some hogs running around loose which exhibited symptoms of the last stages of swine plague, and others in the pens with the characteristic cough. At my request Mr. Sellwyn slaughtered one, and I made

an autopsy, finding the post mortem lesions those of swine plague. I recommended that he, Mr. Sellwyn, should destroy the whole of the hogs, which belonged to a man to whom he rented the premises.

Mr. Sellwyn further remarked that big-jaw, or actinomycosis, was occasionally seen, and that black-leg, or symptomatic anthrax, was very prevalent a few years ago, but of late years it has been on the decline. Scab in sheep is very prevalent. Mr. Sellwyn stated his annual loss from the prevalent cattle disease was \$500.

The next gentleman I interviewed was Mr. Hardy, wholesale butcher, San Diego. He informed me that he shipped some cattle in April and May, 1888, to San Diego, and pastured them in the El Cajon Valley, fifteen miles from San Diego; the cattle appeared healthy until the month of August, when about 2 per cent died. I am informed that the remainder of these cattle were slaughtered in San Diego.

Mr. Hardy also informed me that Mr. Stratton's cattle, also in the El Cajon Valley, began to die, when he sold the remainder to him (Mr. Hardy), who found, on slaughtering them, that two were diseased, the spleens being three times their natural size, and of a dark color on section. The livers were of a brick-red color, and covered with yellow streaks like straws laid across. The kidneys were also diseased, and the flesh when dressed was of a bright yellowish red color.

Mr. Hardy further stated that at least 50 per cent of the cattle within from ten to thirty miles from this coast, in San Diego County, take this sickness, and about 20 per cent of the sick animals die, and the disease appears to be worse between the months of July and December.

When asked about swine plague, Mr. Hardy corroborated Mr. Sellwyn's statement, and stated that he himself, about eighteen months ago, lost between five and six hundred hogs, which he valued at \$2,500.

The next gentleman was a Mr. Cassidy. He stated that he had sold his ranch in 1887, but during the preceding ten years his average mortality was about 20 per cent, the money value of which was about \$1,000 per annum. He also mentioned the fact that one year his cattle died, and his neighbors' did not, although they were only separated by a wire fence, and that next year his neighbors' died and his did not. Mr. Cassidy also observed the fact that cattle brought from the north to this county do not thrive, but that calves and yearlings thrive and do well; also, that mountain cattle brought to the coast die, but that coast cattle taken to the mountains do well.

The next gentleman was Thomas Alvarado, from Rancho Mons-Errupe. He noticed disease on his ranch about ten years ago, and it was, in his opinion, brought in by cattle from Lower California and Mexico. He lost about sixty head last year, and his neighbor, H. H. Green, lost over one hundred head. The cause of death, in his opinion, was due to southern fever. He first noticed this disease about eighteen years ago, directly after Judge Weatherby brought in two hundred cows from Arizona, and gave them to C. Thomas, on shares, at the Hemit Valley. In his opinion, since that importation the disease originated. His brother, D. Alvarado, of Cuervo, lost over sixty head last year, and considered his losses due to southern fever.

My written instructions having arrived, I left next day for Warner's Ranch. I may here state that I had the greatest difficulty in getting my questions answered, and a good many of the answers were calculated to mislead and perplex me. It was almost impossible in many

instances to ascertain any data. On arrival at El Cajon I heard that there was at present no deaths nor sickness among the cattle. On the Santa Marie Ranch I found they had lost a few head, and here I interviewed a Mr. Johnstone, who lives seven miles above this ranch, and he informed me that he had, in 1883, lost twenty head of cattle out of a total of sixty head, and attributed his loss to southern fever. I arrived at Balleno, and left next morning for Warner's Ranch, and on my way I passed through the Santa Ysabel Ranch, which adjoins Warner's, and I found they had lost nine or ten head of yearlings with black-leg.

On arrival at Warner's Ranch, I found Mr. Linton, the manager, was not at home, having gone to Julian, intending to continue his journey next day to San Diego. In course of conversation with one of his men, I was informed that they had lost over one hundred head, and also that they had ceased dying a few days before my arrival, and shortly after the first frost, and therefore I could not hold an autopsy. I decided to go on to Julian and see the manager, so that I could personally interview him. Mr. Linton confirmed the statements made by the man I had seen in the morning; he also added that he purchased and brought some cattle from the San Felipe Ranch, which adjoins the Warner Ranch. A little later ex-Governor Downey of California, and owner of the Warner Ranch, bought four hundred Chihuahua steers, shipped from Mexico to Colton by a man called Skusenbach, and said cattle were delivered by the aforesaid Skusenbach on the Warner Ranch, and a short time after their arrival the natives began to die. Mr. Linton ascribed as the cause of their death, the arrival of the San Felipe cattle. I found out, however, that the other half of the San Felipe cattle, which were bought by Jos. Marks, of Julian, and removed to San Bernardino, remained perfectly healthy, and as yet have caused no disease among the cattle at San Bernardino; whereas, some of the San Felipe cattle on the Warner Ranch died, as well as some of the Warner Ranch stock, shortly after the advent of the four hundred steers from Colton, none of which died.

Mr. Linton said the fattest and best animals went first, while others lingered for days, some of which recovered. On opening some of the dead cattle, he found the spleens enormously enlarged, and the livers enlarged and of a brick-red color, and the gall bladders enormously distended and full of dark green inspissated bile. He said there was an absence of any dark stain to the flesh, which was, if anything, brighter than usual. The Indians and half-breeds devoured the flesh of all that died without as yet having experienced any bad effects, which, in my opinion, could scarcely be possible had it been anthrax, as Mr Linton was inclined to think. Mr. Linton owned to having lost one hundred head, but I am inclined to think he underestimated his loss, as his nephew informed Mr. Bishop, his neighbor, and one of his men, who informed me, that they had sold one hundred and fifty hides, and that others were missing they did not find, placing the loss, in his opinion, between one hundred and eighty and one hundred and ninety head.

From Julian I went to Cuyamaca, Governor Waterman's ranch, and on arrival was informed that a valuable bull had died that morning. It was buried, but I had it disinterred and made an autopsy, finding the post mortem lesions those of southern or Texas fever. I made a microscopical examination of the liver and spleen by means of cover-glass specimens. The microscopical examination confirmed the macro-

scopical diagnosis. The foreman, Mr. B. W. Carey, said: "We have lost in all twenty-one head. We shipped cattle from the Penasquitas Ranch, on the coast, to San Bernardino by car in April, 1888; they remained there three months. In July, 1888, we shipped them with others back to the Penasquitas Ranch. In about two weeks after their arrival two deaths occurred, and we started the cattle next day for the Cuyamaca Ranch, going through by way of Poway and El Cajon. On arrival at Cuyamaca, three died the same night. We had no deaths for a few days, and then two died. They all exhibited the same symptoms."

Mr. Stratton's cattle, pastured in the El Cajon Valley, commenced to die after Governor Waterman's passed through. I must refer you back to Mr. Hardy's testimony, in which he says he bought Mr. Stratton's cattle, and on slaughtering them found two showing the post mortem lesions of southern fever, and also that his own cattle pastured on the El Cajon commenced dying in August. Now, the Governor's cattle passed in the end of July. It would appear from this evidence, if correct, that the Governor's cattle were the means of causing the infection at Poway and El Cajon, and that they without a doubt carried the infection to the bull that died at Cuyamaca.

In connection with those cattle I must state that yearly deaths take place at the Penasquitas Ranch. It is a peculiar fact that none of the cattle shipped to San Bernardino from Penasquitas died, but that the deaths took place two weeks after their return to Penasquitas, with other cattle, which, I was informed by Governor Waterman's son, came from their San Bernardino dairy.

It is well known that deaths have occurred close to Colton, which is two miles from San Bernardino, from southern fever, and it may be that the Governor's cattle crossed a trail and became infected, or caught the contagion on the cars on their return to Penasquitas. But these, being native cattle, could not possibly infect Hardy's and Stratton's cattle, unless some southern cattle were mixed in the herd. It is also a fact that the bull that died at Cuyamaca was raised on the Cuyamaca Ranch, and that no deaths occurred until the arrival of the herd from Penasquitas. I am informed that the original stock of those two ranches was brought in by Colonel Taylor from New Mexico, Iowa, and Kansas. I also examined the remainder of the herd, and found only one sick cow, which was killed, and the post mortem revealed a case of tuberculosis.

Leaving Cuyamaca, I commenced to trace up the infection on Warner's Ranch, and, on my way, passed through the San Felipe Ranch, which adjoins Warner's, and found they had lost five head of cattle, and in one day thirty sheep, which the owner claimed died from eating of a certain weed, specimen of which is inclosed. He also informed me that black leg was of annual occurrence on his ranch. Leaving here, I passed through Warner's for the second time, and went through the center of the four hundred Chihuahua steers, all of which seemed in good condition, as were also most of the natives, no more deaths having occurred since my first visit. Taking up the trail of the Chihuahua steers, the first place I came to was Oak Grove, and Mr. Studebaker informed me that those Chihuahua steers passed through his place, and up to the present no deaths had occurred, but one of his cows was sick, exhibiting a prominent symptom of southern fever. I informed him what to give her. One of the Warner steers had mixed with his herd.

From here I proceeded to Temecula, and found that numerous cattle had died around the town. I interviewed the following gentlemen: Mr. E. J. Tolan, who stated that he lost one heifer three weeks after the Warner steers came through; two years ago he lost thirteen on the same trail. Mr. Nichols has lost ten or twelve head this year; Mr. Philip Casis has lost five head this year; Mr. Hutchinson has lost twenty head this year, and most of his herd has been sick. He opened some of those that died, and found the gall bladders enormously distended and full of dark, inspissated bile, and the spleens also enormously enlarged. All those he opened presented similar appearances. The first animal that died was his best and fattest cow, and it occurred about the middle of July, 1888. Previous to that some southern steers were seen in the hills, and two of them mixed with his herd, and were with them for several days. Mr. Linton, manager of Warner's Ranch, informed Mr. Hutchinson that those Chihuahua steers were scattered from Colton to his ranch, some thirty or forty being missing.

Mr. Gerber, at Nigger Cañon, lost ten head, some of those roving steers also having appeared around his place.

Mr. Brady, three miles from Temecula, lost fifteen head. He said that Warner's steers came through in August, and that his cattle died before they came through; and as Mr. Hutchinson's boys informed me they saw steers on the hills around Temecula as early as the sixth of July, they could not be stragglers from those that went through in August.

I now proceeded to the Santa Marguerita Ranch, when Mr. O'Neil informed me, concerning the Warner steers, that Mr. Skunsenbach brought them from Chihuahua, and pastured them on the Castile Ranch, fifteen miles from Colton, and sold them to ex-Governor Downey. He said: "I went to see those cattle, but declined to purchase them. On the twelfth of July, 1888, I delivered cattle to Hardy, of San Diego, and he informed me that he had seen stragglers (southern cattle) on the hills around Temecula." This seems to coincide with the date of the death of Mr. Hutchinson's first cow. He also said that Colonel Taylor brought cattle from Texas to Cuyamaca and Penasquitas two years ago, and some of those which were of a high grade died, the Texans, in his opinion, infecting them. Also, that they are killing Texas and New Mexico cattle continually in San Bernardino City. He stated his own losses had been about ten to fifteen head this fall, and attributed same to cinabar poisoning and ticks.

From here I went to San Juan Capistrano and interviewed Mr. Marcus Foster. He said that Mr. O'Neil brought in cattle from Texas on to the Santa Marguerita Ranch, which adjoins his, and that said cattle broke down the fences and mixed with his, and he lost one hundred head. Next year, same thing occurred, and they mixed, as well as others he brought from Arizona, and he lost from eight hundred to one thousand head. This year, 1888, I have lost about one hundred head of cattle. I made an autopsy on this ranch, and found the cause of death to be southern fever. He further stated all the ranches below have been affected in a similar manner, and as we never had this disease before, it must have been brought in.

From this ranch I went to Colton, where the Warner steers were unshipped. I here interviewed Mr. Castile, owner of the Castile Ranch. He said: "Mr. Skunsenbach brought four hundred steers from Chihuahua to my ranch, fifteen miles from here, in June, 1888, and pastured them

on my ranch for two months, and then sold them to ex-Governor Downey; his son helped to deliver them on the Warner Ranch; deny losing any on the way. In September, 1887, I lost fifty-six dairy cows, worth \$3,000, and attribute this loss to the cattle being driven across my ranch and affecting it. This year I lost none."

I now proceeded to the Southern Pacific office at Colton, and the shipments of cattle to this point are as follows:

First—From Benson, Arizona; arrived May third, for Marcus Foster, San Juan Capistrano.

Second—From Tucson, Arizona; arrived April sixth, also for Marcus Foster.

Third—On March thirteenth, Skunsenbach shipped in one hundred and thirteen head of cattle, but they were slaughtered in Colton and San Bernardino.

I now went to the Santa Fe office at Colton, and found that Skunsenbach shipped four hundred head of Chihuahua cattle into Colton on June 6, 1888, and sent them down to the Castile Ranch, as already stated.

Having now obtained all the evidence, and with due regard to conflicting statements, no doubt purposely made in a great many cases, I drew the following conclusions concerning the outbreak of southern fever in San Diego County: That southern cattle have been shipped into Colton, and from there traveled by the following trails: That going to Warner's Ranch, and that going to Capistrano, and also by O'Neil's trail from San Geronio to Rancho Santa Marguerita; and that these cattle have infected the trails, and by that means the native cattle.

At the request of Dr. Orme, of Los Angeles, I made a short inspection in that city, and found it far from being in a satisfactory condition. I heard complaints from some of the veterinary surgeons that glandered horses were not destroyed, as they should be. In company with Dr. Whittlesey, veterinary surgeon, I visited Mr. W. W. Curtis, on Anderson Street, Los Angeles, and found he had lost three cows within one week, from what Dr. Whittlesey considered southern fever, and in which I agree with him, when the following facts are taken into consideration:

First—Scenton Bros., of the Orleans Market, ship in southern cattle.

Second—Said cattle are unloaded at the railroad yards, and driven ten miles to Scenton Bros.' yard, by way of the river bottom.

Third—Mr. W. W. Curtis' cows grazed right in this bottom where those cattle were driven. In view of these facts, and the scattered condition of the slaughter houses in Los Angeles, and to prevent such contagion, the animals ought to be unloaded in the slaughter yards, and said slaughter houses should be all in one place, and not scattered, as is the case in Los Angeles and San Diego. San Diego has the better facilities, as all the offal can be taken out to sea and dumped by means of a lighter.

I now proceeded to Hanford, Tulare County, and on arrival I interviewed Dr. J. A. Davidson. He said: "I examined some cattle two and one half miles from here, that were brought from the Salinas Valley, and put in a field of alfalfa, and about thirty days ago they commenced dying, after being three weeks on the alfalfa."

I next interviewed Mr. Motheral, and he said the cattle came from the Salinas Valley, and in two weeks after arrival began to die. On the way they passed through the Polly-Heilbron Ranch, where cattle have been dying this year in great numbers, and when frost came the mortality

ceased. He said: "I consider the disease to be southern fever, as it was identical in symptoms, course, and post mortem lesions with what I have seen in Florida and Mississippi."

I now went to Mr. Sanborn's, four miles from the city, and found E. J. Felton had lost nineteen head this year (1888); last year (1887), sixteen head; usually carries about forty head. This year they died about the first of September—on the advent of some cattle from the Coast Range in the month of August, 1888. The post mortem lesions, described by Mr. Felton, correspond to those of southern fever.

I now went to Mr. Sanborn's field and made an autopsy on a cow which was killed in the morning, and found nothing to indicate the acute stage of southern fever, but from the condition of the liver and gall bladder, it was either commencing or recovering from it. In the lungs I found the bronchial tubes full of the *strongylus micrococcus*, which causes parasitic bronchitis, and, from the number of animals coughing in the herd, I had no doubt others were afflicted, and told the boys what to give them.

I now made an autopsy on a calf, in same field, which had been dead two days, but as the weather was cool I was able to get the lesions well defined, except where the post mortem was on the under side, from gravitation. I found the lesions to be those of southern fever. I also made a microscopical examination of the spleen and liver, by means of cover-glass specimens, but could not find any signs of the bacillus of anthrax.

Mr. Sanborn said: I sold my hay to Polly, Heilbron & Co., to be fed on my ranch, and they brought one thousand four hundred head of cattle from their place, and about three days after arrival they commenced to die, and about four hundred and fifty died on the ranch before they left.

From the evidence taken at Hanford it can be seen that the Polly-Heilbron ranch was affected, and that the cattle reported dying by Dr. Davidson, according to Mr. Motheral, crossed this ranch, and in about three weeks commenced dying from southern fever, and again, the Polly-Heilbron cattle brought to Mr. Sanborn's died, and the post mortem lesions are identical with those of southern fever, as far as a post mortem made two days after death can be relied upon.

In view of this testimony, I can place the contagion among those cattle from Salinas in two places:

First—In the Salinas Valley. Before leaving I found that valley infected, in October, 1888.

Second—On the Polly-Heilbron grant, where the cattle have been dying this fall; and from the post mortem made at Sanborn's on their calf, I have only one opinion to advance, and that is, the cause of death was southern fever; and such being the case, was it not possible for the steers that came from Salinas to become infected when crossing that ranch?

As Mr. Biddle, of Hanford, informed me that the deaths around the county had ceased, and I could do nothing more, I left for San Francisco.

On the fourteenth of December Dr. Spencer reported the following: Mr. Granger, residing in the southern part of Santa Clara County, reported to him, Dr. Spencer, the death of two young horses in one week. The deaths were very sudden, and the diagnosis from the autopsies was

anthrax, and the history of the case is as follows: Hay was procured from Mr. O'Toole's ranch, where anthrax was known to exist, as Sargent's cattle died there of that disease this fall, and on opening the bales many of the same were found to contain parts of dead animals, and presumed to be parts of animals that had died of anthrax, and in this manner Dr. Spencer thought the contagion was carried to Mr. Granger's horses. The doctor also said that the county authorities failed to see the necessity of burning over the fields and carcasses on O'Toole's ranch when the Sargent cattle were known to die of anthrax.

Respectfully submitted.

THO. BOWHILL, M.R.C.V.S.,
Special Agent U. S. Bureau of Animal Industry.

REPORTS ON INDIGENT SICK IN COUNTY HOSPITALS.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the City and County Hospital, San Francisco, for the year ending June 30, 1890.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
14	Abscess		14	Hypochondriasis	
1	Abscess, abdominal		16	Hysteria	
4	Abscess, mastoid		18	Iritis	
1	Abscess, maxillary		18	Lumbago	
4	Abscess, inguinal		28	Malingerer	
8	Abscess, cervical		30	Measles	
5	Adenitis		6	Metritis	1
108	Alcoholism, acute	18	9	Nephritis	1
9	Alcoholism, chronic		52	Neuralgia	
13	Amputation, finger		9	Ophthalmia	
2	Amputation, foot		50	Orchitis	
3	Amputation, leg		6	Otorrhœa	
2	Amputation, hand		5	Ovaritis	
1	Amputation, toes		6	Pediculosis	
3	Amputation, thigh		17	Paralysis	
7	Anæmia		6	Paraplegia	
2	Anchylolosis of elbow		14	Peritonitis	5
1	Anchylolosis of hip		9	Pharyngitis	
1	Aneurism, abdominal		2	Phlegmons	
1	Aneurism, carotid		84	Pleurisy	
3	Aneurism, aorta		25	Phymosis	
2	Aortic obstruction		167	Pregnancy	
10	Abortion		7	Psoriasis	
91	Bronchitis	8	17	Sciatica	
35	Carcinoma	18	88	Sprains	
6	Cirrhosis of liver	5	29	Stricture, urethral	
7	Cerebro-spinal meningitis	1	13	Synovitis	
3	Diphtheria	2	118	Syphilis	
18	Erysipelas	1	9	Syphilis, secondary	
56	Fever, typhoid	18	4	Syphilis, tertiary	
122	Fever, malarial	1	5	Tabes dorsalis	1
75	Heart disease	37	8	Tonsillitis	
68	Pneumonia	81	4	Tuberculosis, testicle	
836	Phthisis	133	6	Trauma of spine	
3	Stricture, cesophagus	4	124	Ulcer, carious	
1	Septicæmia	2	8	Ulcer, varicose	
28	Senility	3	9	Varicose veins	
223	Rheumatism	3	10	Varicocele	
9	Rheumatism, syphilitic		35	Asthma	
27	Lacerated wounds		18	Epilepsy	
31	Contused wounds		32	Eczema	
69	Influenza		14	Dyspepsia	
7	Pneumonia, typhoid	6	36	Debility	
17	Hemiplegia	1	10	Diarrhœa	
22	Hernia				

Number of months reported	12	Discharged cured	1,508
Total on hand at commencement of year	305	Discharged improved	1,538
Total admitted	3,679	Died	404
		Remaining under treatment	352

Name and location of hospital: CITY AND COUNTY HOSPITAL, San Francisco, California.
Physician's name and Post Office address: J. H. HEALY, San Francisco, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Tehama County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
...	Consumption	8	.....	Typhoid malarial fever.....	1
...	Typhoid pneumonia	2	.....	Dropsy	1
Number of months reported	12		Discharged	136	
Total on hand at commencement of year	24		Died	7	
Total admitted	148		Percentage of deaths	20½	
Discharged cured	136		Remaining under treatment	29	

Name and location of hospital: TEHAMA COUNTY HOSPITAL, Red Bluff, California.*Physician's name and Post Office address:* W. D. OLENDORF, Red Bluff, California.

Condition, location, sewerage, ventilation, and water supply, good. Physician's attendance, once every day.

The County Physician for 1889 has gone to the mountains, and will not be home for a couple of months.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Kern County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
39	Malarial fever	1	5	Dysentery .....	...
17	Malaria .....	...	1	Cancer .....	...
22	Rheumatism .....	...	3	Typhoid malaria .....	...
3	Asthma	1	8	Ulcer .....	...
8	Paralysis	2	7	Whisky disease	1
3	Heart disease	1	5	Throat disease .....	...
8	Consumption	3	3	Shot wounds	2
7	Syphilis	1	5	Dyspepsia .....	...
7	Pneumonia	1	6	Erysipelas .....	...
5	Bronchitis .....	...	1	Piles .....	...
2	Typhoid pneumonia	1	2	Amputations .....	...
15	General debility	3	2	Hemorrhage of lungs .....	...
6	Fractured limbs .....	...	6	Morphine habit	1
1	Fistula .....	...	3	Catarrh .....	...

There are a number of admissions of trifling diseases not mentioned in this report.

Number of months reported	12	Discharged cured	157
Total on hand at commencement of year	19	Died	18
Total admitted	206	Percentage of deaths	15
		Remaining under treatment	20

Name and location of hospital: BAKERSFIELD, Kern County, California.*Physician's name and Post Office address:* L. S. ROGERS, Bakersfield, California.

The Kern County Hospital is situated half a mile southwest of the center part of the town of Bakersfield, and occupies a building area of seventy-five feet by one hundred and fifteen feet. There is a park, comprising two acres, for garden and recreation grounds. The water supply is adequate and sufficient, and is supplied by the Bakersfield Water Company. The ventilation of hospital is sufficient. The supplies are furnished through the Superintendent, on charges against the county, without any restriction on the part

of the Board of Supervisors. The medical attendants consist of one Visiting Physician, one Steward, and two nurses.

The hospital consists of two wards, twenty by thirty feet each, containing each eight beds; two double rooms, fifteen by twelve feet, containing two beds each; two single bed-rooms, twelve by twelve feet, containing each one bed; kitchen, dining-room (twenty by forty feet), office, and drug store.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Shasta County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
2	Debility, old age (85 years).....	2	1	Fractured spine (fell).....	1
3	Phthisis pulmonalis	3	1	Fracture clavicle, pneumonia.....	1
2	Cardiac, dropsy	2	1	Scrofula.....	1
1	Bronchitis, chronic.....	1	1	Acute dysentery	1
Number of months reported.....		12	Discharged cured.....		72
Total on hand at commencement of year		42	Died		12
Total admitted.....		98	Remaining under treatment		55

Name and location of hospital: SHASTA COUNTY HOSPITAL, one half mile from town of Shasta, California.

Physician's name and Post Office address: J. M. BRICELAND, Shasta, California.

This hospital is located one half mile west of the town of Shasta. The following buildings are on the grounds: One building, 16x62 feet, occupied by the Steward and family; one building, 18x40 feet, six rooms and dining-room; one building, 33x30 feet, five rooms and one large room for patients; new building, 80x64 feet, three rooms for patients; building, 15x16 feet, one room for four patients; building, 20x16 feet, one room and office; building, 12x12 feet, one room for three patients; store-room, 12x12 feet. Sewerage, ventilation, and water supply are very good. There is one medical attendant. A bath house, 12x16 feet, is being erected, and water will be piped from springs.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Mariposa County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
---	Heart disease	1	-----	Old age and general anæmia.....	1
---	Consumption	2	-----	Cirrhosis of liver	2
---	Dysentery	2			
Number of months reported.....		12	Discharged cured.....		12
Total on hand at commencement of year		25	Died		8
Total admitted.....		22	Percentage of deaths, about.....		16
			Remaining under treatment		27

Name and location of hospital: MARIPOSA COUNTY HOSPITAL, Mariposa, California.

Physician's name and Post Office address: H. C. REID, Mariposa, California.

Mariposa County Hospital is located in Mariposa town, the site being the side of a mountain, a very healthy and pleasant location.

Water supply: A large spring higher up the mountain, and piped to large tank on hospital lot.

Smallest space occupied by any one inmate is six by eight feet, most of them having considerably more. Ventilation perfect.

Condition of inmates good, considering the average age, being about seventy years.

Physician employed for year by the county.

C. G. LIND.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the San Joaquin County Hospital and Almshouse, for the year ending December 31, 1889.

Total by each Disease	DISEASES.	No. Deaths by each Disease	Total by each Disease	DISEASES.	No. Deaths by each Disease
50	Rheumatism		5	Lumbago	
37	Fevers	1	2	Pleurisy	
54	General debility and old age	4	6	Hemorrhage	1
4	Blind		2	Poison oak	
2	Partially blind		1	Hydrocele	
12	Dementia		2	Shaking palsy	
1	Idiot		3	Pneumonia	1
1	Felon		4	Broken leg	
6	Wounded		2	Bubo	
18	Varicose ulcers		2	Knife wound	
2	Burnt		3	Epilepsy	
24	Paralysis	5	2	Jaundice	
35	Alcoholism	1	4	Cut foot	
18	Cripple		1	Carbuncle	
6	Asthma		1	Varioloid	
4	Broken clavicle		2	Dislocation	
14	Destitute		2	Eczema	
6	Abscess		4	Cramps	
38	Injured: hand, feet, side, face, etc.		4	Bronchitis	
7	Hemorrhoid		1	Dyspepsia	
9	Syphilis, secondary		1	Suppressed menses	
11	Syphilis		2	Cancer of stomach	1
3	Erysipelas	1	4	Hypertrophy of liver	2
5	Cystitis	1	3	Neuralgia	
1	Catarrh of bladder		1	Broken rib	
3	Morphine habit		3	Gastritis	2
9	Valvular disease of heart	1	2	Incised wound of chin	
10	Sprain		3	Stricture of urethra	
3	Enteritis	1	1	Fracture of arm, and fever	
5	Dropsy	3	1	Cataract of both eyes	
4	Vertigo		1	Chorea	
4	Granulated eyelids		1	Lead poison	
35	Phthisis pulmonalis	5	2	Pyæmia	2
1	Fever sore		2	Aneurism of aorta	1
5	Gonorrhœa		1	Catarrh of head	
1	Sarcoma of jaw		2	Cerebro-spinal meningitis	2
1	Orchitis		1	Necrosis of knee	
1	Fistula		1	Necrosis of finger	
1	Pregnancy		2	Prolapsus of arm	
1	Hernia		1	Apoplexy	1

Number of months reported..... 12
 Total on hand at commencement of year..... 144
 Total admitted..... 363
 Discharged cured..... 230

Discharged..... 363
 Died..... 36
 Percentage of deaths..... 06.7
 Remaining under treatment..... 138

Name and location of hospital: COUNTY HOSPITAL AND ALMSHOUSE, Stockton, California.
Physician's name and Post Office address: WM. E. GIBBONS, Stockton, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Inyo County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
3	Rheumatism		3	Consumption	2
2	Colds		1	Non compos mentis	
2	Kidneys		4	Lead.....	4
3	Heart disease				

Number of months reported.....	3	Discharged cured.....	8
Total on hand at commencement of year	3	Discharged.....	8
Total admitted.....	18	Died	6
		Remaining under treatment.....	3

Name and location of hospital: INDEPENDENCE, Inyo County, California.*Physician's name and Post Office address:* IRVING J. WOODEN, Independence, California.

The hospital is well ventilated. Pure water is brought from the mountains. The place is well supplied with everything that is needed. Medical attendance is first class in every respect. The area of the hospital grounds is about four acres. The wards are large and well ventilated.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Stanislaus County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
7	Typhoid fever.....		5	Syphilis	
8	Malarial fever.....		2	Measles	
6	Fractures of bones		2	Stricture of urethra	
8	Contused wounds		1	Chronic cystitis	1
2	Incised wounds		3	Phthisis	1
2	Diseases of eye		1	Bright's disease of kidneys	
1	Tonsillitis		5	General debility	
1	Pyemia		1	Scrofula	
1	Mania		1	Concussion of brain	
12	Superannuated	2	1	Concussion and contusion spine.....	1
4	Paralysis		3	Pneumonia	1
1	Spinal sclerosis		1	Gastric catarrh	
1	Hydrops articuli		1	Delirium tremens	
5	Chronic rheumatism		1	Cancer of intestines.....	1
6	Heart disease	3	1	Hemorrhoids	
1	Strangulated hernia		1	Dry gangrene	

Number of months reported.....	11½	Discharged.....	12
Total on hand at commencement of year	19	Died	9
Total admitted.....	87	Percentage of deaths.....	8½
Discharged cured	62	Remaining under treatment	23

Name and location of hospital: STANISLAUS COUNTY HOSPITAL, Modesto, California.*Physician's name and Post Office address:* C. W. EVANS, M.D., Modesto, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Santa Barbara County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
1	Chronic alcoholism .....	.....	3	Locomotor ataxia.....	1
1	Dementia .....	.....	1	Injury to head .....	.....
2	Intermittent fever .....	.....	1	Injury to back .....	.....
5	Phthisis pulmonalis	3	1	Injury to leg.....	.....
5	Chronic rheumatism .....	.....	2	Ophthalmia .....	.....
3	Acute rheumatism .....	.....	1	Chronic bronchitis .....	.....
5	Syphilis .....	.....	1	Cirrhosis of liver	1
1	Gonorrhœa .....	.....	2	Heart disease	1
1	Chronic ulcer .....	.....	1	Poison oak .....	.....
1	Hemorrhoids .....	.....	1	Chronic abscess .....	.....
2	Paralysis.....	1	1	Neuralgia .....	.....

Number of months reported.....	12	Discharged.....	19
Total on hand at commencement of year	20	Died	7
Total admitted	44	Percentage of deaths	18½
Discharged cured	21	Remaining under treatment.....	18

Name and location of hospital: SANTA BARBARA COUNTY HOSPITAL AND POOR FARM, Santa Barbara, California.

Physician's name and Post Office address: C. S. STODDARD, Santa Barbara, California.

Condition of sewerage, ventilation, and supplies, good. Medical attendance excellent. Surface area to each patient, sixty feet. Occupied twelve months. Water supply first class.

J. D. AXTELL.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Alameda County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
4	Abscesses		61	Indigents not sick	
15	Adynamia		3	Insane	
27	Alcoholism	4	4	La grippe	
8	Amputations, finger		4	Loss of sight	
3	Amputations, arm		1	Loss of hearing	
4	Amputations, leg		19	Malaria	
7	Anasarca	5	1	Melancholia	
11	Asthma		1	Nephritis, acute	
2	Bright's disease	2	3	Nephritis, chronic	
5	Births	1	1	Neurasthenia	2
12	Bronchitis, chronic		2	Neuralgia	
1	Bronchitis, capillary	1	2	Opium habit	
30	Bruises, sprains, and other minor injuries		5	Orchitis	
4	Cancer	2	1	Painters' colic	
1	Carbuncle		23	Paralysis	2
1	Cerebritis		82	Paronychia	
5	Cripples			Phthisis pulmonalis	18
5	Dementia		5	Pneumonia	1
4	Diarrhoea, acute		1	Prolapsus ani	
8	Diseases of the eye		1	Ptyalism	
5	Dislocations, shoulder		5	Rheumatism, acute	
4	Dyspepsia		50	Rheumatism, chronic	
5	Enciente		1	Shock	1
4	Epilepsy		12	Syphilis, primary	
3	Erysipelas		11	Syphilis, secondary	
1	Fistula, vesico rectal		4	Syphilis, tertiary	
10	Fractures, upper extremities		1	Tænia	
12	Fractures, lower extremities		16	Ulcers of leg	
7	Fever, typhoid		7	Urethral strictures	
2	Gangrene	2	7	Uterine diseases	
1	Gastro enteritis	1	1	Variola	
2	Gonorrhoea		2	Wounds, gunshot	
12	Heart disease	4	1	Fracture of spine	1
Number of months reported			12	Discharged	402
Total on hand at commencement of year			181	Died	47
Total admitted			507	Percentage of deaths	6½
				Remaining under treatment	239

Name and location of hospital: ALAMEDA COUNTY INFIRMARY, three miles northeast of San Leandro, Alameda County, California.

Physician's name and Post Office address: A. SHIRK, San Leandro, Alameda County, California.

Our general condition is good; location, sewerage, ventilation, and supplies, all good. Water supply, very good and abundant, from springs on the premises. Farm of one hundred and twenty-three acres.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Sierra County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
1	Hemiplegia, left side.....		2	Wounds of scalp.....	
1	Interstitial absorption of the head of the femur.....	1	1	Neuralgia of bowels.....	
9	Old age.....	3	3	Disease of heart.....	2
2	Insanity.....		1	Amputation of femur.....	
1	Bronchitis.....		3	Alcoholism, acute.....	
1	Clubfoot.....		2	Frozen feet.....	
1	Lightning pains.....		1	Wound of hand.....	
1	Chronic cystitis.....		1	Dislocation of humerus.....	
1	Asthma.....		1	Paralysis agitan.....	
1	Cataract.....		2	Venereal.....	1
1	Atrophy rectus femoris.....		1	Traumatic cataract.....	
2	Consumption.....		1	Carbuncle on neck.....	
8	Sciatica.....		1	Diarrhoea.....	
			1	Injured by fall.....	
Number of months reported.....		12	Discharged.....		22
Total on hand at commencement of year.....		20	Died.....		7
Total admitted.....		26	Percentage of deaths.....		15.2
Discharged cured.....		11	Remaining under treatment.....		18

Name and location of hospital: SIERRA COUNTY HOSPITAL, Downieville, California.*Physician's name and Post Office address:* ALEMBY JUMP, Downieville, California.

Located on bank of North Fork of Yuba River, on a flat which was formerly mined by sluicing. Sewerage perfect; ventilation through windows. Supplies purchased by Board of Supervisors. Dr. Alembly Jump visits daily at 9 o'clock A. M.; salary, \$800. Surface area, fifty-eight square feet to each patient. Site occupied eleven years. Water supply from river, through flume and iron pipes.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

*Treated in the Lassen County Hospital, for the year ending December 31, 1889.**Name and location of hospital:* LASSEN COUNTY HOSPITAL, Susanville, California.*Physician's name and Post Office address:* DR. MILLIKIN, Susanville, California.

It is a difficult matter to answer your questions, as this is a poorly run hospital. There have never been any records, and there are none yet. The county has never furnished a register. Of course, I have all the names that have been in since I took it, but I do that in order to get my pay. I am paid \$5 a week for board and washing of each patient, and I pay \$10 a month for the house, so you can judge what kind of a hospital it is. As for ventilation, that is through holes in the roof. Sewage is run into Susan River. We have our bath tubs in the Susan River.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Humboldt County Hospital, for the year ending July 31, 1890.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
8	Acute rheumatism.....		4	General debility.....	
1	Fistula in ano.....		1	Fracture of spine.....	
1	Acute nephritis.....		2	Abscess in legs.....	
4	La grippe.....		1	Convulsions.....	
2	Gastric catarrh.....		1	Nosebleed.....	
1	Softening of brain.....		1	Loss of leg.....	
1	Paralysis.....	1	1	Acute iritis.....	
2	Fracture of leg.....		1	Acute conjunctivitis.....	
4	Acute bronchitis.....		1	Abscess in back.....	
2	Chronic bronchitis.....	2	4	Alcoholism.....	
2	Acute pneumonia.....	1	1	Bubo.....	
2	Cataract.....		2	Childbirth.....	
2	Gunshot.....		4	Consumption.....	8
1	Stabbed.....		1	Chronic cystitis.....	1

Number of months reported.....	12	Discharged cured.....	81
Total on hand at commencement of year.....	28	Discharged.....	9
Total admitted.....	57	Died.....	8
		Percentage of deaths.....	10½

Name and location of hospital: COUNTY HOSPITAL, Corner of Trinity and J Streets, Eureka, California.

Physician's name and Post Office address: S. B. FOSTER, Eureka, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Plumas County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
9	Chronic rheumatism.....		2	Fractures.....	
1	Paralysis.....	1	2	Bronchitis.....	
1	Chronic syphilis.....		2	Varicose veins.....	
1	Cancer.....	1	1	Consumption.....	
1	Gunshot wounds.....	1	8	General debility, old and worn-out persons.....	4
1	Dropsy, valvular disease of heart.....	1			
1	Prostatitis.....				

Number of months reported.....	12	Discharged cured.....	12
Total on hand at commencement of year.....	10	Discharged.....	8
Total admitted.....	20	Died.....	8
		Remaining under treatment.....	11

Name and location of hospital: PLUMAS COUNTY HOSPITAL, Quincy, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Fresno County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
50	Fever, intermittent	1	53	Injuries	2
12	Fever, remittent	1	2	Cancer	2
8	Fever, continued	4	9	Alcoholism, chronic	1
2	Fever, typhoid	1	5	Asthma	1
12	Phthisis pulmonalis	3	3	Bright's disease	2
15	Bronchitis	1	3	Nasal catarrh	2
2	Pleurisy, chronic	1	3	Fistula in ano	—
30	Rheumatism	2	3	Nephritis	—
11	Pneumonia	1	2	Hernia	—
3	Neuralgia	—	2	Hydropericarditis	1
2	Blind	—	1	Scurvy	—
19	Paralysis	1	6	General debility	—
2	Diarrhoea	1	1	Diphtheria	—
25	Syphilis	2	3	Measles	—
26	Gastric fever	2	4	Eczema	—
3	Eye disease	—	5	Uterine diseases	—
5	Epilepsy	—	1	Hydrocele	—
Number of months reported			12	Discharged	34
Total on hand at commencement of year			54	Died	29
Total admitted			279	Percentage of deaths	84
Discharged cured			185	Remaining under treatment	86

Name and location of hospital: FRESNO COUNTY HOSPITAL, Fresno, Fresno County, Cal.
Physician's name and Post Office address: LEWIS LEACH, M.D., Fresno, Cal.

This institution is located on a lot containing eighty acres, one mile east of the city limits of Fresno. It was erected in 1889, at a cost of \$45,000, and consists of four buildings, connected by verandas, on the plan of the Sacramento County Hospital.

Buildings.—The main or central building: The offices, dispensary, parlor, and Steward's room on first floor; four rooms on second floor, and five rooms on third floor, and is supplied with water, bath-room, closets, and fireplaces. The other three buildings contain six wards, 24x60x18; dining-room, kitchen, and store-rooms. Each ward contains eighteen beds, and the walls are hard finished and heated with wood stoves. Each ward has eight windows on a side, together with bath-room, ante-room, closets, and nurse-room—twenty windows in all, and protected by inside shutters and wire screens.

Water.—The water is supplied from a well one hundred and thirty-five feet deep, by a steam pump, into three 10,000-gallon tanks, one above the other, in a tank house one hundred and five feet high. The bottom of the upper or fire tank is ninety feet from the ground. Five faucets are in each ward and dining-room, both outside and inside.

Sewerage.—Connected with a large cesspool, is a vitrified pipe, which conveys the sewage to a system of cesspools located about seven hundred yards from the buildings; a pipe is also laid for the purpose of flushing when necessary.

Supplies.—Are furnished by yearly contract, except medicines, which are ordered when required by the County Physician.

Medical Attendance.—The hospital is visited daily, or oftener if necessary, by the County Physician. There are employed, a hospital steward, three nurses, cooks, and others, to the number of nine, all told.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the San Benito County Hospital, for the year ending August 1, 1890.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
6	Various accidents.....		2	General debility.....	
4	Bronchitis.....		3	Remittent fever.....	
1	Ulcer, chronic.....		1	Cataract.....	
2	Cystitis.....		1	Partial dementia.....	
2	Phthisis pulmonalis.....	2			
<hr/>					
Number of months reported.....		12	Discharged.....		16
Total on hand at commencement of year.....		4	Died.....		2
Total admitted.....		22	Percentage of deaths.....		6
Discharged cured.....		16	Remaining under treatment.....		4

Name and location of hospital: SAN BENITO COUNTY HOSPITAL, Hollister, California.
Physician's name and Post Office address: J. H. TEBBETTS, Hollister, California.

By contract with Board of Supervisors all indigent sick, also broken down and enfeebled persons, are placed in care of County Physician. They are comfortably lodged and boarded by a Matron, at \$4 per week for each individual.

The County Physician, when necessary, employs nurses for any patient requiring extra attention. He also buys clothing for the patients. All medicines are supplied by a druggist in town, of good quality, as ordered by Physician, at a specified price, by contract.

The hospital is located on the principal business street of Hollister. The patients are required to remain on the premises. For the past two years frequent inspections by Board of Supervisors have been made, and everything found in a neat and healthy condition. No complaints have been made to me by any patient for over one year as regards food, clothing, or lack of care.

Salary of County Physician is low—only \$25, with no prospect of anything better, so far as one can judge.

The total expenses of the hospital and care of patients will average about \$115 or \$120 per month. This includes all expenses.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Merced County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
6	Diarrhoea and dysentery.....		8	Rheumatism.....	
6	Erysipelas.....		2	Tonsillitis.....	
2	Typhoid fever.....		2	Peritonitis.....	
16	Malarial fever.....		3	Scirrhus.....	1
7	Phthisis.....	8	2	Inanition.....	1
3	Pneumonia.....		2	Measles.....	
2	Bronchitis.....		8	Typho-malarial fever.....	
3	Heart disease.....	2	29	Indigent.....	
5	Alcoholism.....	1	38	Other causes.....	2
<hr/>					
Number of months reported.....		12	Discharged.....		31
Total on hand at commencement of year.....		36	Died.....		10
Total admitted.....		106	Percentage of deaths.....		7.17
Discharged cured.....		68	Remaining under treatment.....		33

Name and location of hospital: MERCED COUNTY HOSPITAL, one half mile south of Merced City.

Physicians' names and Post Office address: DR. E. S. O'BRIEN, DR. G. P. LEE, Merced City, California.

The condition of our hospital is good, having been thoroughly repaired the past year. The location is one half mile south of Merced City. The sewerage is not as good as could be wished for, as the ground is flat, so we have to drain into cesspools. Ventilation is very good. Supplies all that can be desired. Medical attendance daily. Surface area to each patient, eight feet square, when the hospital is full; when not full, of course they have more room. The main building has been occupied as a hospital some fifteen years, the new part six years; but the whole building last year had a thorough renovation. Water supply good.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Santa Clara County Hospital, for the year ending December 31, 1889.

Total by each Disease	DISEASES.	No. Deaths by each Disease.	Total by each Disease	DISEASES.	No. Deaths by each Disease.
65	Phthisis	24	2	Varioloid	
15	Paralysis	6	4	Influenza	
38	Infirm		1	Fever, intermittent	
10	Imbecile		3	Insane	
7	Asthma		1	Chorea (Saint Vitus' dance)	
1	Blind		4	Wounds, knife	
38	Rheumatism		1	Sciatica	
5	Heart disease	4	9	Dropsy	
25	Ulcerations, chronic		3	Granulated eye	
7	Dislocations		2	Lumbago	
1	Cataract, eye		1	Tumor	
1	Ophthalmia		1	Burns	
5	Cystitis, chronic		23	Fever, malarial	
1	Varices		9	Diarrhoea, chronic	1
11	Bronchitis		2	Scrofula	
15	Sprains		2	Felon	
3	Enciente		3	Constipation	
14	Fever, typhoid	3	1	Fistula	
2	Erysipelas		6	Catarrh	
10	Abscess		1	Neuralgia	
11	Contusions		2	Hernia, rupture	
14	Gonorrhoea		1	Colic, lead	
18	Syphilis		2	Cancer	
4	Epilepsy		1	Pneumonia	1
19	Alcoholism	4	1	Inflammation of brain	1
4	Kidney disease			Syphilitic carbuncle	1
2	Fever and ague			Convulsions	1
3	Amputation	2		Suicide	1
7	Wounds, gunshot	1		Dislocated vertebra	1
7	Fractures			Cirrhosis of liver	1
12	Poison oak			Fracture of back	1
1	Poison wounds			Empyema	1
Number of months reported		12	Discharged		168
Total on hand at commencement of year		91	Died		54
Total admitted		384	Percentage of deaths		8.31
Discharged cured		154	Remaining under treatment		80

Name and location of hospital: SANTA CLARA COUNTY HOSPITAL, San José, California.

Physician's name and Post Office address: WILLIAM H. HAMMOND, San José, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Sonoma County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
8	Fracture		2	Enciente	
4	Imbeciles		2	Dislocated wrist	
9	Syphilis		1	Dislocated ankle	
14	Rheumatism		2	Dislocated shoulder	
1	Resection of elbow joint	1	1	Hemorrhage of lungs	1
2	Traumatic pleurisy	1	1	Hemorrhage of kidneys	
17	Fever		8	Asthma	
4	Fever, typhoid	2	6	Chronic alcoholism	
3	Fever, malarial		6	Cancer	
15	Wounds		1	Chorea	
7	Dyspepsia		3	Phthisis pulmonalis	
2	Gastritis		3	Hysteria	
6	Eczema of leg	1	2	Poison oak	
9	Heart disease	1	1	Sprained ankle	
1	Indigestion		1	Tonsilitis	
8	Bronchitis	1	1	Hypochondriac	1
4	Pneumonia	2	3	Cystitis	1
2	Chronic inflammation of liver	2	2	Gonorrhoea	
2	Diabetes mellitus	1	2	Locomotor ataxia	
1	Albuminuria		1	Hernia	1
14	General debility	3	1	Metritis	
3	Abscess		8	Chronic ulcer of leg	
1	Sciatica		2	Dropsy	1
2	Chronic diarrhoea	1	1	Synovitis	
1	Scurvy		1	Morphine habit	
2	Iritis		8	Burn	
8	Erysipelas		1	Aphonia	
3	Internal injuries	2	1	Epilepsy	
Number of months reported		12	Discharged		51
Total on hand at commencement of year		36	Died		23
Total admitted		172	Percentage of deaths		129
Discharged cured		96	Remaining under treatment		38

Name and location of hospital: SONOMA COUNTY HOSPITAL, near Santa Rosa, California.*Physician's name and Post Office address:* M. M. SHEARER, Santa Rosa, California.

Condition, just refitted, hence excellent. Location, two and one half miles from city limits, at foot of mountains; exceptionally healthy. Sewerage bad; open cesspool three hundred yards from building. Ventilation wretched. House planned and built with an inclosed court on three sides; open slit ventilators on floors, none above. Supplies ample and first class. Medical attendance: one physician in attendance daily; one Steward, one Matron, and one nurse. Surface area, etc., eight by six feet. Water supply, by windmill and horse-power; insufficient, and not very good.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Santa Cruz County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
1	Intra capsular fracture of femur.....	1	1	Ulcer right arm	
2	Extra capsular fracture of femur.....		1	Insanity	
2	Paralysis.....		1	Orchitis	
10	Indigent.....		2	Poison oak.....	
1	Traumatic erysipelas.....		2	Acute bronchitis.....	
4	Inflammatory rheumatism.....		1	Asthmatic bronchitis.....	
2	Muscular rheumatism.....		4	Alcoholism.....	1
1	Sciatic rheumatism.....		6	Typhoid fever.....	
1	Gonorrhoeal rheumatism.....		1	Dysentery.....	
1	Fracture of fibula.....		1	Dyspepsia.....	
1	Amputation of fingers.....		2	Syphilis.....	
1	Carbuncle.....	1	1	Fracture of femur.....	
1	Palmar ulcers.....		1	Fracture of tibia fibula.....	
3	Varicose ulcers.....		1	Compound fracture of tibia.....	
2	Heart disease.....	1	2	Sprained knee.....	
1	Cut foot.....		1	Contused chest.....	
1	Punctured wound, thorax.....		1	Dislocated spine.....	
1	Blindness.....		1	Sprained back.....	
1	Apoplexy.....	1	1	Contused nose.....	
1	General paresis.....	1	1	Abscess of abdomen.....	
1	Fractured rib.....		1	Sprained ankle.....	
1	Fractured clavicle.....		1	Tuberculosis.....	
1	Iritis.....		1	Incised wound in leg.....	
5	Pulmonary consumption.....	3	17	Old age.....	
1	Incised wound, ear.....		1	Hemorrhoids.....	
Number of months reported.....		12	Discharged		62
Total on hand at commencement of year		25	Died		9
Total admitted.....		79	Percentage of deaths		11½
Discharged cured		45	Remaining under treatment.....		30

Name and location of hospital: SANTA CRUZ COUNTY HOSPITAL, Santa Cruz, California.
Physician's name and Post Office address: F. E. MORGAN, Santa Cruz, California.

REPORT TO THE STATE BOARD OF HEALTH OF THE INDIGENT SICK

Treated in the Solano County Hospital, for the year ending December 31, 1889.

Total by each Disease.....	DISEASES.	No. Deaths by each Disease.	Total by each Disease.....	DISEASES.	No. Deaths by each Disease.
5	Paralysis.....	1	2	Alcoholism.....	
5	Ulcer, chronic, leg.....		3	Phthisis pulmonalis.....	1
3	Rheumatism.....		1	Cystitis.....	
1	Balanitis.....		2	Spermatorrhœa.....	
6	Fever, remittent.....		1	Mitral insufficiency.....	
4	Fever, intermittent.....		1	Excision inferior maxillary necrosis, following from gunshot wound.....	
1	Fever, typhoid.....				
1	Parophthalmitis.....		2	Fracture skull, trepanning.....	1
1	Phlegmon.....		1	Fracture, tibia.....	
1	Fever, continued.....		1	Fracture, clavicle.....	
3	Syphilis, secondary.....		1	Fracture, fibula.....	
1	Syphilis, tertiary.....				
1	Stricture, urethral.....				
Number of months reported.....		12	Discharged cured.....		47
Total on hand at commencement of year.....		22	Discharged.....		49
Total admitted.....		56	Died.....		3
			Remaining under treatment.....		28

Name and location of hospital: SOLANO COUNTY HOSPITAL, Suisun, Solano County, Cal.
Physician's name and Post Office address: W. G. DOWNING, Suisun, Cal.

REPORT OF THE STATE ANALYST.

The office of State Analyst was created by the Legislature of 1885, and was approved March fifth of that year by Governor Stoneman. The State Medical Society, at its annual meeting April 17, 1884, had passed the following resolution:

Resolved, That the Legislature be recommended to create the office of State Chemist, * * * who shall act in conjunction with the State Board of Health, and whose duty it shall be to analyze food, drugs, remedies, waters, etc., and report upon the same for the general good of the people, and to the discomfiture of parties dealing in adulterated and spurious articles of food and medicine.

This action of the State Medical Society was warmly seconded by the State Board of Health, and its recommendations embodied in the Act creating the office of State Analyst. It should be said that the President, Secretary, and members of the State Board of Health have at all times done everything in their power to foster this office, and earnestly and heartily commend it to the liberal support of the people of the State of California.

The intent of the State Medical Society, which initiated this movement, of the State Board of Health which indorsed it, and of the Legislature which adopted it, was to protect and care for the people at large in matters where they could not protect themselves. In so doing California has only followed the lead of the older States in this country. Surely no more conservative field of legislation can be found.

A careful study of the organic act will disclose a twofold object:

First—Sanitary, *i. e.*, to provide for an official examination of foods, drinking water, drugs, medicines, wines, etc.

Second—To aid in the development of home resources. Under this head is included the provision for the analysis of mineral waters, wines, and all the products connected with the wine industry.

The importance of this work is apparent to every one. That the food buyer should receive the article he asks for and pays for is the first principle of commercial honesty; that the food, drugs, medicines, etc., should be pure is absolutely necessary to health, and the treatment of disease. I do not think that any discussion of this proposition is necessary; the only point upon which discussion may arise relates to the ways and means of carrying it into effect. Here again, it seems to me, the method is simple. Two things are necessary: first, the procuring of the samples; and second, they must be analyzed.

These samples may be presented by individuals, consumers who are in doubt or suspicious of the purity of the food article which they consume. Dealers who wish to buy and sell approved articles only, will present samples for examination from time to time. Experience has shown that where this examination of foods has been thoroughly carried out, the dealers are the first to present their samples for approval before purchasing. They regard the analyzing chemist as their friend, and seek his advice and opinion. The Inspectors of the local Boards of

Health are a body who can furnish samples, and the great majority, too, for analysis. It will be seen that no new legal machinery is necessary to begin and carry forward this important work.

The other side of the question, relating to the analysis of samples, is also simple. The State Analyst, when provided with suitable assistants, can make all the analyses required. With a moderate appropriation for chemical work the whole scheme of supervision of food, drugs, and medicines can be maintained.

The examination of the drinking waters of the State is one of the most important problems with which the State has to contend. As the State becomes more populous the more imperative will it become. Three years ago the State of Massachusetts appropriated thirty thousand dollars (\$30,000) for this work, and has appropriated twenty-five thousand (\$25,000) yearly ever since. The first report will be given to the public this year, and it is not too much to say that it will in all probability be a most valuable contribution on the subject of water supply for cities and towns. In a supplement to this report I shall take up this question in detail, and will present some of the conclusions reached by the Massachusetts investigation. So much, however, I can state, that they have found it necessary to investigate the waters of each section and determine their constitution. The waters of the State may be classified into districts, and each has its own peculiarities and composition.

The water problem with us is peculiar, and differs from that of any other State, and must be settled by thorough and independent investigation. It has been a matter of great regret to the State Analyst that he has not been able to do more work upon this problem. Many samples of water have been submitted for analysis during the last two years, which could not be examined because there was no one to do the work.

The analysis of the mineral waters of the State is of the highest importance, both from a health and political standpoint. California has more mineral springs than any other State in the Union, and, presumably, better ones; yet, from lack of proper analysis and investigation, they are not appreciated and patronized as they deserve. Every year large numbers of our own citizens, as well as those from neighboring States, visit the mineral springs of Europe, at great expense to themselves and loss of patronage to us. I know of no direction in this State in which a small expenditure of money would bring so large a return in the form of permanent development. The mineral springs would supplement the known attractions of climate, and many thousand visitors would yearly come to our coast if they could but know the value of our mineral waters. A report printed under the auspices of the Board of Health, giving the analysis of our springs, would do much to attract visitors and immigrants.

The materials for a full report are not available at this time, and I shall present them in the form of a supplement to be published at an early date. In this supplement I shall present a statement of the work that I have done, and discuss some of the problems which belong to the office of State Analyst.

In this conclusion I will say that the University has just built a new laboratory for the department, in which suitable working-rooms are provided for the State Analyst. It is very doubtful if better accommodation for carrying on investigations in this department can be found anywhere.

They have been planned with care, and provision has been made for the service of the State in this direction. I have had the opportunity of visiting the more important laboratories of this country and Europe the past summer, and have used the occasion to study the methods of analysis and investigations as applied to foods, etc. I trust that such provision may be made for the support of this office as will enable it to do the work for which it was created.

Respectfully submitted.

W. B. RISING,
State Analyst.

BERKELEY, November 1, 1890.

MONTHLY REVIEW OF DEATHS AND PREVAILING DISEASES

REPORTED TO THE STATE BOARD OF HEALTH FROM JUNE 30, 1888,
TO JUNE 30, 1890.

[Reprinted from Monthly Circular of State Board of Health.]

JULY, 1888.

Mortality reports received from eighty-five cities and towns within the State return the number of deaths as nine hundred and fifty-eight in an estimated population of seven hundred and seven thousand eight hundred and fifty, a monthly percentage of 1.34 per thousand, or an annual death rate of 16.06, which indicates that the low mortality noticed in last report still continues.

CONSUMPTION, which, as before remarked, adds largely to our monthly mortality, gives the remarkably small number of one hundred and thirty-seven deaths in July, a decrease of nineteen from last report, which was then the smallest recorded in several months.

PNEUMONIA caused forty-six deaths, thirty-nine occurring in San Francisco, the remaining seven being distributed throughout the State, which is a great decrease in the mortality from this disease, and indicates a general absence of acute pulmonary diseases.

BRONCHITIS caused but sixteen deaths throughout the State, San Francisco, Oakland, and Los Angeles contributing them all.

CONGESTION OF THE LUNGS was fatal in seven instances among children.

WHOOPING-COUGH is credited with thirteen deaths, eleven of which occurred in San Francisco and two inland.

DIPHTHERIA continues to add to our mortality, twenty-eight deaths being attributed to it and nine to croup, which makes a record of thirty-seven deaths from these twin diseases. San Francisco reported eleven, Oakland eleven, San Bernardino three, Sonora two; College City, Etna Mills, Truckee, Vallejo, Napa, Los Angeles, Mono, Watsonville, San José, and Stockton one each.

SCARLET FEVER caused seven deaths, one in Sacramento, one in Elk Grove, one in Grass Valley, one in Wheatland, and three in San Francisco.

MEASLES had the small mortality of two.

SMALLPOX caused two deaths, both in San Francisco; recent arrivals there.

TYPHOID FEVER is credited with thirty-five deaths; same mortality as occurred in June.

REMITTENT FEVER was fatal in ten instances.

CEREBRO-SPINAL FEVER caused twelve deaths, which is double the number recorded in June.

CANCER was fatal to forty-three decedents, which is a large increase for the month.

HEART DISEASE also carried off the large number of seventy-two.

ERYSIPELAS was fatal in two instances.

ALCOHOLISM caused six deaths.

The following towns report no deaths during the month of July: Biggs, Bodie, Castroville, Cedarville, Dixon, Downieville, Downey, Fort Bidwell, Gonzales, Igo, Knights Ferry, Lincoln, Livermore, Merced, and Roseville.

PREVAILING DISEASES.

Reports received from eighty-five localities indicate a limited amount of sickness throughout the State, the most prevalent being disorders of the alimentary canal and paludal fevers. There seems to be an increasing prevalence of typhoid fever, which can in almost every instance be traced to impurity in the water consumed. This may be expected until the rainy season sets in, when the ground water will rise and correct the impurities which probably exist in all shallow wells that receive the surface drainage.

CHOLERA INFANTUM prevails quite generally, and is noticed in reports from Santa Ana, Lodi, Healdsburg, Dixon, College City, Fort Bidwell, Lakeport, Shasta, Williams, Sisson, Lemoore, Cottonwood, San Francisco, Oakland, Healdsburg, Truckee, and Stockton. If it is true, as recorded by Hayem, that cholera infantum depends upon the development of a microbe in the bowels, mothers cannot be too careful in seeing that the milk fed to babies during the summer months is first boiled, and never given when *sour* or *musty*, but freshly prepared for each meal. Hundreds of lives are sacrificed yearly by neglect of this precaution. The boiling of the milk from cows fed upon alfalfa is particularly requisite, as this kind of feeding seems to give an irritating quality to the milk, which in most babies induces a very violent diarrhea and disturbance of the stomach.

DIARRHŒA is mentioned as prevailing to a noticeable degree in Mariposa, Sierra City, Dixon, College City, Cedarville, Alturas, Fort Bidwell, Colton, Lakeport, Bakersfield, Shasta, Sisson, Downey, Santa Clara, Tulare, Livermore, Calico, Benicia, Gridley, Sacramento, and Salinas.

DYSENTERY is reported in Jolon, Tulare, Igo, Mariposa, Colton, Sisson, Santa Cruz, Truckee, Salinas, and Millville.

CHOLERA MORBUS was also noticed in College City, Lemoore, Bakersfield, Williams, Truckee, and Redwood City.

All of these diseases are more or less influenced by meteorological conditions, extreme heat being a prominent factor when associated with insanitary conditions, decomposing material, or unsuitable food.

SMALLPOX.—There was but one case of smallpox reported in July, and that came by train from Bethany, near Stockton, to San Francisco. No other cases of smallpox seem to have arisen from it. Two cases of smallpox were imported from China on the second of August, and were at once provided for by the City Board of Health of San Francisco. We may, therefore, practically claim California to be free from the disease.

MEASLES, in a mild form, was present during the month in Sonora, Sisson, Jolon, Millville, Santa Clara, Redwood City, Lodi, Biggs, Castroville, and Oakland.

SCARLET FEVER was observed in Lemoore, Biggs, St. Helena, Wheatland, Elk Grove, Sacramento, Grass Valley, and San Francisco.

DIPHTHERIA was quite prevalent in Oakland during the month, and is mentioned in reports from San Francisco, Sonora, Tulare, Truckee, Etna Mills, Riverside, College City, San Bernardino, Napa, Pomona, Stockton, and Vallejo. The contagious nature of the disease ought to insure prompt disinfection of every article used by the sick, and strict isolation should be enforced in every case. There is no doubt that diphtheria is frequently propagated by permitting mild cases of the disease to mingle with the public, it not being generally known that from the mildest attack the most virulent can be and often is developed.

WHOOPING-COUGH was present in Gridley, Bakersfield, Biggs, Tulare, Lockeford, Calico, Bodie, and San Francisco.

ERYSIPELAS.—Sporadic cases of this disease were reported in Sacramento, Downey, Igo, Truckee, Merced, Tulare, Gridley, Sonora, Mariposa, Sierra, Fort Bidwell, Millville, Bakersfield, Williams, and St. Helena. The type was mild and not attended by any serious mortality.

TYPHOID FEVER was noted in Colton, Cloverdale, Chico, Davis, Jackson, Los Angeles, Oakland, Pasadena, Redwood, Sacramento, San Francisco, San José, San Diego, Fort Bidwell, Lakeport, Shasta, Igo, Healdsburg, Hills Ferry, Santa Clara, Merced, Etna Mills, and Salinas.

TYPHO-MALARIAL FEVER was present in Davis, College City, Elk Grove, Pomona, Millville, Truckee, Igo, Lemoore, Tulare, and Cloverdale.

REMITTENT FEVER was noticed in Dixon, College City, Sierra, Knights Ferry, Williams, Bakersfield, Downey, Ontario, Lemoore, Tulare, Bodie, Cloverdale, Cottonwood, and Wheatland.

PNEUMONIA.—Some cases of this disease were noticed during the month in Santa Clara, Downey, Brownsville, Gonzales, Lockeford, Tulare, Etna Mills, Castroville, San Diego, Salinas, San José, Marysville, Colfax, and San Francisco.

CHOLERA is prevalent in Hongkong, and has made its appearance again in Japan. The proximity of cholera through the constant commercial intercourse between these countries and our own, renders us peculiarly exposed to an invasion of the disease, recollecting the persistence with which cholera germs maintain their existence under the most adverse circumstances. With bowel disorders so prevalent as they are now, the human system is in a condition of receptivity that would readily become infected and develop the disease in its most fatal form. Sir Joseph Fayer, from his great experience in India, maintains that under certain circumstances cholera morbus, or summer cholera, may become epidemic, and is undistinguishable from Asiatic cholera, variation being in severity and not in kind. It is therefore prudent to avoid all known causes of bowel disorders, especially overripe or decayed fruit, and all noxious emanations from any source. The strictest hygienic measures should be enforced within our cities, our dwellings, and surroundings. All garbage and decaying organic matter should be burned or deeply buried, outhouses cleaned and whitewashed, as cholera, if it once invades our State, will spare none but those who have made themselves secure by sanitary forethought and precaution.

PACIFIC COAST WEATHER.

WEATHER.—Rain fell in Washington Territory on the 1st, 2d, 3d, 11th, 12th, 13th, 14th, 25th, 26th, 27th, and 28th; in Oregon on the 1st, 2d, 3d, 12th, and 13th; and local showers in California on the 11th, 12th, 17th, 18th, 19th, and 20th.

Thunder storms occurred along the California coast, north of San Francisco, on the 11th, and in the mountain districts of eastern California on the 17th, 18th, 19th, and 20th, those on the three latter days being unusually severe.

Two storms were traced during the month, passing from the coast to the east over Washington Territory and Oregon, on the 2d and 11th.

RAINFALL.—The precipitation has been about normal throughout California; elsewhere it has been about half an inch above. The heaviest rainfall reported for stations in California was 3.51 inches at Summit.

TEMPERATURE.—The mean temperature has been about normal over the entire coast. An unusually warm wave extended along the coast of California on the 15th; the maximum thermometer on that date at San Francisco reading 93.4 degrees, being the highest temperature recorded at that point since 1840. The warm wave spread over the interior valleys the following day, and extended to Oregon and Washington Territory on the 17th;

but continuing over the interior of California until the 24th, when it moderated somewhat. The highest temperature reported from stations in California was 117 degrees, at Mammoth Tank, on the 22d; the average of the observations taken daily at 2 p. m. at that station being 110.2 degrees, and the monthly mean temperature of 97.20 degrees. Maximum temperature of 100 degrees, or over, were reported from all stations in California other than those located on the immediate coast or in the mountain districts.

AUGUST, 1888.

Mortality reports received from fifty-one cities and towns, with an estimated population of seven hundred and twenty-two thousand six hundred, give the number of deaths as nine hundred and eight, which is a monthly percentage per thousand of 1.25, or an annual death rate of .15 per thousand, which is the lowest percentage we have had during the year, and indicates an absence of any serious epidemic disease.

CONSUMPTION caused one hundred and thirty-eight deaths, over one sixth of the total mortality.

PNEUMONIA was fatal in forty-three instances—thirty-two of them in San Francisco, four in Oakland, and one each in Stockton, Santa Rosa, Santa Clara, San Bernardino, Nevada City, Marysville, and Dixon.

BRONCHITIS caused fourteen deaths, thirteen of which occurred in San Francisco, and one in Trinity County.

CONGESTION OF THE LUNGS was fatal in nine instances—one in Sacramento, one in San Diego, and seven in San Francisco. From these statistics we infer that outside of San Francisco acute pulmonary disease was almost absent from the State during the month.

WHOOPIING-COUGH is credited with four deaths, three of which occurred in San Francisco and one in San Bernardino.

DIPHTHERIA still continues a large factor in our mortality list, no less than thirty-one deaths being caused by it during the month. If we add to this ten from croup, we have a mortality of forty-one from these allied diseases. San Francisco reports nineteen, Oakland seven, Los Angeles five, Sisson three, and one each in Watsonville, Stockton, Selma, Santa Cruz, San José, San Bernardino, and Cloverdale.

SCARLET FEVER caused two deaths—one in Sacramento and one in Lemoore.

MEASLES had no mortality during the month.

SMALLPOX caused no deaths.

TYPHOID FEVER was fatal in twenty-seven instances, which is a decrease from last report.

TYPHO-MALARIAL FEVER was fatal in six instances.

REMITTENT FEVER is credited with eighteen deaths, which is an unusual mortality from this disease.

CEREBRO-SPINAL FEVER caused six deaths.

CANCER was fatal in twenty-four instances, which is a decrease of nearly one half from last report.

CHOLERA INFANTUM was the cause of thirty deaths, which is a marked decrease from July, when the deaths from this cause were sixty.

DIARRHŒA and DYSENTERY were fatal in thirteen instances, which is also a decrease from the last report.

HEART DISEASE caused sixty-two deaths.

ERYSIPELAS was fatal in four cases.

ALCOHOLISM increased its mortality from six in July to twelve in August.

The following towns report *no deaths* during the month: Alturas, Auburn, Azusa, Biggs, Bodie, Calico, Castroville, Cottonwood, Downeyville, Etna Mills, Elk Grove, Forest Hill, Fort Bidwell, Gridley, Hills Ferry, Igo, Knights Ferry, Lincoln, Lakeport, Millville, Roseville, Sierra City, Shasta, and Williams.

PREVAILING DISEASES.

Reports received from seventy-five localities continue to indicate a very limited amount of sickness throughout the State, and although during some days within the month the temperature ranged as high as 111 degrees in some parts of the State, not a single case of *sunstroke* or thermic fever was reported to this office, or, as far as known, occurred within its bounds.

CHOLERA INFANTUM was noticed with some frequency in Lemoore, Dixon, Sacramento, Mariposa, Cedarville, Fort Bidwell, Sierra City, Pomona, Salinas, San Diego, Los Angeles, San Bernardino, Oakland, and San Francisco.

DIARRHŒA and DYSENTERY were observed in Millville, Lemoore, Anaheim, San Diego, Monterey, Jolon, Castroville, San Bernardino, Downey, Tulare, Fresno, Cloverdale, Knights Ferry, Cottonwood, Lincoln, Biggs, Weaverly, Anderson, Etna Mills, Sisson, Truckee, Alturas, Sierra City, Vallejo, and San Francisco.

MEASLES was noticed in Castroville and Cloverdale.

SCARLET FEVER was present in Sacramento, Lemoore, Biggs, Sisson, Oakland, and San Francisco. The type is singularly mild, and attended by a very limited mortality.

DIPHTHERIA still occupies a considerable portion of the State, and adds a large item to our death rate during August. It was noted in reports from San Francisco, Oakland, San Bernardino, Los Angeles, Santa Cruz, Selma, Watsonville, St. Helena, Anderson, Sisson, Colfax, Etna Mills, Sonora, Gridley, and Fresno.

WHOOPING-COUGH was present in Anderson, Calico, Elsinore, Livermore, San Bernardino, and San Francisco.

ERYSIPELAS, in sporadic form, was observed in Millville, Downey, Biggs, Colfax, Sierra City, Fresno, Brownsville, Oakland, and San Francisco.

TYPHOID and TYPHO-MALARIAL FEVER is mentioned as present in Elk Grove, Sacramento, Lemoore, Hopland, Igo, Anderson, Knights Ferry, Cloverdale, Colton, San Diego, San Bernardino, Los Angeles, Pasadena, Pomona, Hills Ferry, Truckee, Fort Bidwell, Etna Mills, Tulare, Salinas, Oakland, and San Francisco. In Yuma, Arizona Territory, Dr. Taggart writes typhoid fever and diphtheria are epidemic.

REMITTENT FEVER is noticed in Bodie, Millville, Lemoore, Cottonwood, Lodi, Igo, Williams, Alturas, Knights Ferry, Downey, Sisson, Colfax, Fresno, Elsinore, Lockeford, and Shasta.

PNEUMONIA.—A limited number of cases of this disease were noticed in Downey, Salinas, San Bernardino, Dixon, Marysville, Nevada City, Oakland, Santa Clara, Santa Rosa, Stockton, and San Francisco. It is not marked "prevalent" anywhere, and was probably as limited as it will be during the year.

BRONCHITIS has almost disappeared from our sickness reports, although a case or two was noticed in Bodie, Weaverville, Mariposa, Fresno, and San Bernardino. It was more frequent in San Francisco than anywhere, but there the disease was limited, as a rule, to the advanced in life.

PAROTIDITIS, or MUMPS, was quite epidemic in Castroville.

SMALLPOX has, we regret to say, reappeared in San Francisco, Oakland, and Redding. In San Francisco, August twenty-third, it was introduced by a man trading on the San Joaquin River; in a few days several cases developed, and by the thirtieth of the month fourteen cases were in the hospital. Two cases were detected in Oakland, but were immediately quarantined. One case was also detected in Redding, and placed in the smallpox hospital. Owing to the exceeding mildness in the character of the disease which developed during the past winter, proper precautions were not taken in those parts of the State, outside the large cities, to properly destroy the clothing, disinfect or fumigate the premises, or render it improbable or impossible for the disease germs to exist in or about those attacked by the disease, many of the cases never going to bed, and others as equally careless of the health of their neighbors. As a result we may look for an outbreak of the disease when the winter season approaches and these diseased garments are again brought into use. What was mild in its form last winter may be most virulent in its course this winter. The wisest course to pursue, then, is to get vaccinated early, and thus anticipate disease by timely preventive measures.

PACIFIC COAST WEATHER.

The pressure was highest over Northern California on the second, and Southern California on the eighteenth. It was lowest over California on the fourteenth.

TEMPERATURE.—The temperature was slightly above the average in Northern California, and from one to two degrees below the normal in Southern California; the highest temperature reported from any Signal Service Station in the State during the month was from Fresno, where the temperature on the twenty-fourth was reported at 111 degrees.

STORMS.—No storms of violence appeared on the Pacific Coast during the month. A light rain fell in the vicinity of San Diego on the twenty-eighth. It moved northeasterly, resulting in very light showers, disappearing in Inyo County during the early morning of the thirtieth. A light shower also fell in the vicinity of Fort Bidwell on the sixteenth.

SEPTEMBER, 1888.

Mortality reports received from sixty-four cities and towns, with an estimated population of seven hundred and two thousand seven hundred, record the deaths therein at eight hundred and eighty-two, giving a monthly percentage per thousand of 1.26, or an annual death rate of 15 per thousand, which is the same as that in August, and unmistakably shows the healthy condition of the State, and how exceedingly low our death rate is compared with that of any other State in the Union. The principal causes of death were:

CONSUMPTION, which carried off one hundred and sixteen decedents, the larger number dying in San Francisco, where such cases congregate in large numbers.

PNEUMONIA was fatal in thirty-eight instances, which is a slight decrease from last report, but large enough to indicate an increase in the frequency of the disease.

BRONCHITIS caused fourteen deaths, all of which occurred in the coast counties, except one, which is credited to Oroville.

CONGESTION OF THE LUNGS was fatal in five instances.

DIARRHŒA and DYSENTERY were fatal in fourteen cases, which shows an abatement in the prevalence of the disease.

CHOLERA INFANTUM, although abating, gives a record of thirty deaths, which is the same as recorded last month.

DIPHTHERIA was fatal in twenty instances, which is a decrease of eleven from last report. Only five deaths occurred in San Francisco from it. Five were reported from Oakland, four from Los Angeles, two from Nevada City, two from St. Helena, one from Stockton, and one from Santa Barbara.

CROUP.—Fourteen deaths are recorded from this disease—eight in San Francisco, three

in Oakland, two in Los Angeles, and one in Lincoln. In all these places diphtheria was present. The inference is therefore strong that all these cases were diphtheritic.

WHOOPING-COUGH was fatal in six instances.

SCARLET FEVER is credited with four deaths—one in Hollister, one in San José, one in Red Bluff, and one in San Francisco. The disease is not prevalent.

MEASLES caused no deaths in this month.

SMALLPOX was fatal in two instances, both occurring in San Francisco.

TYPHOID FEVER is beginning to increase our mortality tables, forty-two deaths being recorded against it; nearly double the number of those dying in August.

TYPHO-MALARIAL FEVER has, however, only four deaths attributed to it.

REMITTENT FEVER, on the contrary, records seventeen deaths, an unusual number; not quite as many as were attributed to it last month by one.

CEREBRO-SPINAL FEVER caused seven deaths—three in San Francisco, two in Santa Rosa, one in Tulare, and one in Woodland.

ERYSIPELAS was fatal in three instances.

HEART DISEASE is credited with fifty-one deaths.

ALCOHOLISM was fatal to eight decedents.

The following towns, with an estimated population of fourteen thousand four hundred, report no deaths during the month: Anderson, Bodie, Castrovilla, Colfax, College City, Colton, Dixon, Elk Grove, Fort Bidwell, Lemoore, Millersville, Newman, Ontario, Sierra City, Shasta, and Wheatland.

PREVAILING DISEASES.

Reports received from eighty-five localities in different parts of the State all agree upon the extreme healthfulness of their respective districts.

CHOLERA INFANTUM was observed in several instances in San Bernardino, Sisson, Elsinore, Dixon, Sacramento, and Oakland.

DIARRHŒA AND DYSENTERY are mentioned in reports from Lincoln, Elsinore, Shasta, Benicia, Weaverville, Anaheim, San Bernardino, Fresno, Sisson, Downey, Livermore, Tulare, Fort Bidwell, Sierra City, Bakersfield, Gonzales, Marysville, Sacramento, Oakland, Pomona, Vallejo, and Truckee.

SMALLPOX, during the month, numbered twenty-four cases in San Francisco. In Stockton one case was imported from San Francisco; another appeared in Livermore, one case developed in Elk Grove, and one in Sacramento City. All were strictly quarantined, and so far the disease has not spread. For reasons heretofore given, we may look for a gradual increase of the disease. Prudence should, therefore, suggest that vaccination be insisted upon throughout the State, as time can alone tell whether the disease now commencing may develop an epidemic or malignant tendency, or continue in the mild form assumed during the past winter and spring. Better far to prevent either by timely vaccination, which is safe and certain to protect those availing themselves of it.

MEASLES is mentioned as in Jolon.

SCARLET FEVER is lingering here and there throughout the State. The type is peculiarly mild, and the mortality very limited. It is noted in reports from San Francisco, Jolon, Anderson, Hollister, San José, Visalia, and Red Bluff.

DIPHTHERIA.—Nineteen cases were reported from San Francisco, where the disease is abating. In Oakland a good many cases occurred; also in Los Angeles. Sporadic cases were mentioned in St. Helena, Sonora, Sisson, Lincoln, Jolon, Etna Mills, Truckee, Nevada City, Santa Barbara, and Stockton.

WHOOPING-COUGH is present in St. Helena, Livermore, Angels Camp, College City, Chico, Petaluma, and Bakersfield.

ERYSIPELAS was noted in Sacramento, San Bernardino, Fresno, Weaverville, Millville, Mariposa, Bakersfield, Oakland, and San José.

TYPHOID FEVER is mentioned in reports from Anaheim, Sisson, Alturas, Jolon, Newman, Livermore, Fort Bidwell, Etna Mills, Truckee, Colton, Healdsburg, Jackson, Marysville, Oakland, Pasadena, Petaluma, Sacramento, San Bernardino, San Diego, San Francisco, Santa Ana, Santa Barbara, and Stockton. At this season of the year we expect typhoid fever to prevail more or less, but so far there has been only sporadic cases, without any tendency to become epidemic.

REMITTENT FEVER seems much more prevalent than any fever except the intermittent fever, and seems to take the form called bilious. It is reported in Fresno, Oakland, Oroville, Sacramento, San Bernardino, San Diego, San Francisco, Downey, Benicia, Sisson, Knights Ferry, Cottonwood, Newman, Lakeport, Tulare, Truckee, and Bakersfield.

PNEUMONIA is again mentioned in our reports, in different places: Fresno, Livermore, Ventura, Calistoga, Anderson, Bakersfield, Oakland, San Francisco, Santa Rosa, San Diego, Oroville, Los Angeles, Healdsburg, Red Bluff, and Chico.

BRONCHITIS is also noticed in reports from San Bernardino, Fresno, Cottonwood, Hopland, Bodie, Lakeport, Lemoore, Merced, Red Bluff, Santa Rosa, Oakland, and San Francisco.

VARICELLA, OR CHICKENPOX, is prevalent in Dixon and Mariposa.

YELLOW FEVER.—The presence of this disease in Florida, and its rapid dissemination into neighboring States, has caused some uneasiness in California, lest the large immigration from the South into this State might carry some of the infective germs with it into our warm valleys, where they would have all the requisites for development into destructive activity to the ruin of our State. To guard against such a possibility, the State Board of Health have appointed Dr. S. S. Herrick, an expert in the diagnosis of yellow fever, to visit our southern frontier, and ascertain the extent of our liability to

infection either from Florida or Mexico, and to take every means known to science to guard against the entrance of yellow fever, if such should threaten us. A great many persons, with confidence begotten of an unfamiliarity with the disease, believe that yellow fever could not exist in California, and, therefore, think we have nothing to dread from intercourse with States afflicted with the disease, or the countries where it is epidemic. Experience, however, teaches us that special sanitary precautions are requisite whenever yellow fever approaches us within five days' travel, as within that time it may get into our State before the fever is developed. Years of past immunity will not save us if once we permit the disease germs to get a lodgment in the warm valleys of our State. It is absurd to suppose that yellow fever could find no abiding place upon this coast; the same fallacy was entertained for years in Mazatlan, La Paz, Guaymas, Hermosillo, and Rosario—the latter place, three thousand feet above the level of the sea, where, until within a few years since, the fever was unknown. Yet, when through carelessness and the belief in the invulnerability of the climate to such disease it was admitted, it not only decimated the inhabitants, but is now permanently established as endemic to these places.

Yellow fever requires simply the initial germ, a temperature of 70 to 80 degrees, with a humidity of 70 to 80 degrees, to flourish. The mean temperature of Southern California is between 70 degrees and 80 degrees during the warm months. The mean humidity, say of Los Angeles, is, August 77 degrees, September 82 degrees, October 80 degrees, according to the Signal Service report of last year. The humidity of San Diego was 79, 80, and 82 degrees, for the same months. In Jackson, Florida, the mean temperature is 76 to 80 degrees, and the mean humidity is respectively 82, 82, 80 degrees; so that as far as the temperature and humidity of Jackson, Florida, and that of our southern border, there is not much to choose between them. In the Sacramento Valley the mean humidity is for the same months 68, 69, and 70 degrees; so that the greater dryness of the air would render us liable to cultivate the disease, *but the truth must be acknowledged, that we are as yet ignorant of the limits within which yellow fever can be confined.* Therefore, instead of waiting for it to enter our doors for the purpose of experimenting as to whether it can or cannot live in California, the State Board of Health concluded that the safest course for the State to pursue was to exclude it altogether, if ceaseless vigilance and unremitting attention to complete sanitation can accomplish such purpose.

PACIFIC COAST WEATHER.

The September just passed has been an unusually warm month over all the country west of the Rocky Mountains. The greatest departures from the normal temperature occurred in Idaho and Nevada, where the mean temperature for the month was nearly 15 degrees above the average mean for September. In Northern California the mean temperature was about 10 degrees above the normal in the interior and 3 degrees along the coast, and in Southern California about 5 degrees above the normal.

The rainfall for the month was light, except in the central portion of California, where heavy showers of rain, accompanied by thunder and lightning, fell on the 14th and 15th.

OCTOBER, 1888.

Reports received from seventy-nine localities return a mortality for the month of October of nine hundred and two decedents, in an estimated population of seven hundred and twenty-six thousand eight hundred and fifty, giving the remarkably small monthly percentage of 1.24 per thousand, or an annual death rate of 14.88. We believe that this is a lower percentage of deaths than will be found in any State within the Union for the month of October. The deaths for the month from infectious or zymotic diseases, including typhoid fever, did not reach one tenth of the total mortality, which shows how remarkably free the State is from any epidemic disease with a fatal tendency.

CONSUMPTION, as usual, holds the highest place in our mortality record, one hundred and forty-three deaths being attributed to it, which is an increase over the previous month.

PNEUMONIA also shows an increase, having caused forty-seven deaths in October. This may be attributed to the meteorological changes during the month, causing an increased number of persons to be attacked by the disease rather than to any malignity in its type.

BRONCHITIS was fatal to fifteen decedents.

CONGESTION OF THE LUNGS caused eight deaths.

DIARRHŒA and DYSENTERY was fatal in twenty-two instances, which is an increased mortality from this cause over that of the month previous.

CHOLERA INFANTUM records thirty deaths, which is a large mortality so late in the season. August and September had the same number of decedents from this cause.

DIPHTHERIA was fatal in twenty-six instances, an increase over last month's report. Of these, four died in Los Angeles, four in Santa Barbara, three in Oakland, five in San Francisco, two in Watsonville, and one each in Alameda, Downey, Nevada, Pasadena, Pomona, Rocklin, Sacramento, and San Bernardino.

CROUP caused fourteen deaths. As these were probably all the result of diphtheritic infection, the fatality from this preventable disease is quite a prominent feature in our death record.

WHOOPING-COUGH caused two deaths.

SCARLET FEVER is credited with three deaths—one in Marysville, one in Truckee, and one in San Francisco.

MEASLES was fatal in but one instance.

SMALLPOX caused two deaths, both in San Francisco.

TYPHO-MALARIAL FEVER is credited with six deaths.

TYPHOID FEVER had a fatality of thirty-six, which is a decrease from last report. San Francisco is credited with thirteen of these fatal cases, Los Angeles five, Sacramento four, Redding two, and one each in San Diego, Anaheim, Santa Ana, Santa Barbara, San Bernardino, Watsonville, Riverside, Placerville, Truckee, Oakland, Napa, and Chico.

REMITTENT FEVER caused six deaths—two in San Francisco, and one each in Oakland, San Diego, San Bernardino, and Santa Ana.

CEREbro-SPINAL FEVER was fatal in eleven instances, which is an increase over the report for September. Seven of these were reported from Oakland, one from Chico, one from Igo, one from San Francisco, and one from Santa Rosa.

ERYSIPELAS caused no deaths.

HEART DISEASE caused fifty-five deaths.

CANCER was fatal in eighteen instances.

ALCOHOLISM caused nine deaths.

The following towns report *no deaths* during the month: Alturas, Castroville, Cedarville, Etna Mills, Lockeford, North Bloomfield, Roseville, and Forest Hill.

PREVAILING DISEASES.

Reports received from eighty-four localities are singularly united in the assertion of the reporters that there was no sickness worth speaking of in their several fields of practice, and the assertion seems founded upon fact when compared with the reports of mortality from acute disease.

CHOLERA INFANTUM was observed in many localities in sporadic form, and is mentioned in reports from Wheatland, Elsinore, Lodi, Bakersfield, Colfax, Gonzales, Nevada City, Anaheim, Los Angeles, Oakland, Pomona, Salinas, Sacramento, Santa Ana, Santa Rosa, and San Francisco. The season is late for this disease to be so prevalent, but may be owing to the increased temperature over normal that prevailed throughout the month.

DIARRHOEA AND DYSENTERY seem also to have been quite marked in several localities. In Sacramento, Nicolaus, Cedarville, Brownsville, Wheatland, Merced, Lakeport, Lockeford, Tulare, Redding, Igo, Lemoore, Lincoln, Williams, Red Bluff, Fresno, Downey, San Bernardino, Benicia, Newcastle, Bodie, San Francisco, and other places, they have been quite noticeable from their frequency, but not from their fatality, as the type has been mild and yielded readily to appropriate remedies.

SCARLET FEVER was quite prevalent in Sacramento, San Francisco, Sisson, Colton, Lockeford, Truckee, Biggs, Anderson, Red Bluff, and Marysville. The type is particularly mild, and rarely shows malignancy. This form of the disease leads to gross carelessness upon the part of parents and guardians, in permitting their children to attend school, and in allowing the visits of other children to their houses while the disease is still there, as it is impossible to tell in what case it will take on the mild course, or in what the malignant type. Every case of scarlet fever or scarlatina should be promptly isolated, and no intercourse permitted between the sick and the well, until perfect convalescence was established, and the place of sickness thoroughly fumigated and disinfected. Scarlet fever germs are among all germs most persistent in their tenacity of life; they will live for months, perhaps years, in infected garments, and come forth at some favorable opportunity to reap a harvest of sickness, perhaps death, or, in many instances, to impress a lifelong impairment of bodily strength and vigor. The mildness of the attack is often the precursor of serious disease, and too much care cannot be taken of those affected by scarlet fever in any form, and no words can sufficiently condemn any person who permits the intermingling of the sick suffering from scarlet fever with the well, where it is within the bounds of possibility to prevent it.

MEASLES is mentioned in reports from Jolon. In other places it seems to have exhausted the susceptible material.

SMALLPOX appeared in one instance during the month in Sacramento. The man was working on a ranch some distance from the city, and knew of no means whereby he could have become infected. In San Francisco some few cases were detected in the County Hospital; one case came from Cincinnati on the train, and developed the disease on arrival in San Francisco. As we know not how soon the disease may take on an epidemic character and extensive range, the necessity of immediate vaccination cannot be too earnestly urged. Through it we can avert an epidemic, and by it can positively protect the person from attack. We would therefore urge our local Boards of Health and Health Officers to attend to the vaccination of all unprotected persons at once. A pandemic wave is slowly but surely passing over these United States, and we cannot escape it except by thorough vaccination and revaccination, when it will pass harmlessly by.

DIPHTHERIA unfortunately is a constant visitor in many towns. It is noticed in reports from Rocklin, Truckee, Redding, Biggs, Anderson, Sacramento, San Francisco, Oakland, Watsonville, St. Helena, Santa Barbara, Los Angeles, Tulare, Jolon, San Bernardino, Pasadena, Pomona, Downey, and Alameda. The cases seem sporadic, without any tendency to epidemicity. When attacking children in the form of croup, its fatality is greatest. The necessity of taking all possible sanitary measures to prevent the spread of this formidable disease is apparent, or ought to be, to everybody, and yet we witness public funerals of those dead of the disease; we see houses crowded with mourning friends where the spores of disease are floating all around them, and if they escape it is not owing to their own prudence, but to the condition of their system, which renders them anti-

pathic to the disease at that time. Until such foolish proceedings are forbidden by law, and under a penalty, we may expect diphtheria to be carried from place to place, and to take its victims wherever it can find a suitable medium for its development.

WHOOPING-COUGH is noticed in Merced, Angels Camp, Anderson, and San Francisco. **ERYSIPELAS**.—Sporadic cases are reported in Sacramento, Truckee, Fresno, and St. Helena.

TYPHOID FEVER is mentioned as noticeable in Elsinore, Colfax, Sacramento, Fort Bidwell, Etna Mills, Colton, Anaheim, Redding, Truckee, Igo, Watsonville, Downieville, Millville, San Bernardino, Santa Ana, San Diego, Los Angeles, San Francisco, and Chico.

PNEUMONIA is becoming quite prominent among the prevailing disease reports, which is to be expected as the temperature lowers and the winter rains appear. With—

BRONCHITIS, it is noticed quite frequently in San Francisco, Oakland, San Bernardino, Los Angeles, Downey, Fresno, Tulare, Wheatland, Etna Mills, Lemore, Lakeport, Truckee, Williams, Anderson, Marysville, Brownsville, Rocklin, Downieville, Igo, and other places. The type is not severe, and the disease is not epidemic anywhere.

YELLOW FEVER.—In our last report we mentioned the fact of this Board sending an expert to the frontier, to ascertain our liability to the inroad of yellow fever. Dr. Herrick having visited all the suspected points, reports that no danger is to be apprehended this year. None of the nursery products of Florida will be imported into this State until February or March, when the frost will have entirely killed the microbe upon which yellow fever is supposed to depend, consequently we run little or no danger from this source.

The Board is now engaged upon the work of ascertaining how far the prevailing diseases among cattle are dangerous to human life, and to what extent they prevail or are likely to affect the food supply of the State.

PACIFIC COAST WEATHER.

WEATHER.—The storms appearing off the Pacific Coast during October passed to the east, north of the northern boundary of the United States, and accompanying rain areas did not extend as far south as California. Rain fell in Oregon and Washington Territory on the 6th, 7th, 8th, 12th, 18th, 16th, 17th, 22d, 23d, 24th, 25th, 27th, 28th, 29th, 30th, and 31st, and local showers occurred in the same districts on the 9th, 10th, 11th, and 20th. In the extreme southern portion of California, local rains fell on the 6th, 17th, 18th, and 19th, and in Northern California there were local showers on the 30th.

TEMPERATURE.—The month has been warmer than usual over all the country west of the Rocky Mountains; the greatest departure, 8 degrees, occurring over Nevada, Utah, and eastern Washington Territory, and the least, 2 degrees, along the coast of California.

RAINFALL.—The rainfall for the month has been about the average rainfall for October in Oregon and Washington Territory, and the extreme southern part of California. In Northern California little or no rain fell during the month, except on the northern coast, where the amount was about half the normal.

NOVEMBER, 1888.

Reports for November, received from sixty-eight localities, give a mortality of nine hundred and ninety-seven decedents, in a population estimated at six hundred and fifty-four thousand four hundred, which gives a percentage of 1.5 per thousand in the month, or an annual death rate of 18 per thousand, which is above the average for the past six months, but still a very low rate of mortality for this season of the year, when acute pulmonary complaints prevail, and which in the Eastern States increase their mortality list so very largely. With the advent of the rainy season, respiratory diseases became prominent, and at once made themselves apparent in our mortality returns.

CONSUMPTION caused one hundred and forty-two deaths, about the same as in October. **PNEUMONIA**, which in October produced death in but forty-seven persons, in November caused the decease of one hundred and eight, over double the number.

BRONCHITIS was fatal in twenty-two instances, which is also an increase from the last report.

CONGESTION OF THE LUNGS caused ten deaths.

DIARRHŒA AND DYSENTERY, so fatal during the summer months, have reduced their death rate to five in November, all isolated cases. Last month deaths from these diseases numbered twenty-eight, the change in the atmospheric conditions seeming to have a beneficial effect in modifying their fatality.

CHOLERA INFANTUM.—The deaths from this disease have also fallen from thirty last month to twelve in November. These were all sporadic cases, and in no locality was any epidemic tendency noted.

DIPHTHERIA made a marked advance in the number of its decedents, forty-three deaths being ascribed to it. Twenty-two of these occurred in San Francisco, six in Los Angeles, three in Napa, two each in Downey, San Diego, and Sacramento, and one each in Etna Mills, Nevada City, Pasadena, Hollister, Santa Barbara, Santa Cruz, Stockton, and St. Helena.

CROUP caused ten deaths—seven in San Francisco and three in Los Angeles—probably all diphtheric in their nature.

WHOOPING-COUGH was fatal in seven instances, which is an increase over last month's report, and indicates that the disease is increasing its area of diffusion.

SCARLET FEVER was fatal in two instances only. The disease is quite prevalent, but of an unusually mild type.

MEASLES caused no deaths.

SMALLPOX caused but one death—a child in Merced. There were no other deaths from it reported.

TYPHO-MALARIAL FEVER was fatal in nine instances.

TYPHOID FEVER had a fatality of thirty-one, fifteen occurring in San Francisco, the others in single cases throughout the State.

REMITTENT FEVER caused five deaths—one in Bakersfield, one in San Bernardino, and three in San Francisco.

CEREBRO-SPINAL FEVER caused nine deaths—five in San Francisco, one in College City, one in Colfax, one in Cottonwood, and one in Watsonville.

ERYSIPELAS was fatal in three instances.

HEART DISEASE.—Sixty-one deaths were reported from this cause.

CANCER caused twenty-four deaths.

ALCOHOLISM was fatal to ten persons.

The following towns report no deaths: Bodie, Lakeport, Roseville, Folsom, Ventura, and Wheatland.

PREVAILING DISEASES.

Reports received from eighty localities, in different parts of the State, indicate the increase of zymotic diseases, especially diphtheria, typhoid fever, scarlet fever, and a tendency to the spread of smallpox. The meteorological changes during the month of November has likewise increased all acute diseases of the respiratory organs, influenza being epidemic in many places, and pneumonia and bronchitis quite prevalent.

DIARRHŒA and DYSENTERY show a remarkable decrease in prevalence, but sporadic cases appeared during the month in Knights Ferry, Cottonwood, Etna Mills, Redding, Wheatland, Downey, San Bernardino, Tulare, Fresno, College City, Red Bluff, and Benicia.

CHOLERA INFANTUM has practically ceased to be mentioned in our reports, two or three localities only reporting isolated cases. This fact tends to show how essentially the disease is dependent upon temperature and diet for its maintenance, or that the microbe upon which the disease is, by Hayem, said to depend, is not capable of preserving its existence in lowered temperatures. Isolated cases were noticed in Los Angeles, San Francisco, Lodi, San Bernardino, Downey, Etna Mills, Santa Barbara, and Santa Rosa.

MEASLES is reported in Newcastle and Redding.

SCARLET FEVER is prevalent in Sacramento, Sisson, Biggs, Lockeford, Auburn, Colton, Cloverdale, San Bernardino, Ophir, and San Francisco. In Auburn, Dr. Rooney writes, the disease appeared in neighboring houses, but by strict isolation of them the fever was not permitted to spread. In the town of Ophir there were several cases, with two deaths. In San Francisco only four cases were reported. In Sacramento there were many cases, owing to the want of sanitary precaution to prevent its spread. When scarlatina appears in a community the most rigid isolation should be practiced, as there is no possibility of knowing whether it is the inauguration of an epidemic that will sweep through a town like a devastating plague, or continue its progress in a benignant form. So far as heard from the disease is mild in type, but often producing death from the effects which follow the eruption.

DIPHTHERIA, we regret to say, is mentioned in many reports as present. In San Francisco as many as sixty-two cases were reported during November. It also was noticed in Oakland, Sacramento, St. Helena, Napa, Sisson, Truckee, Igo, Etna Mills, Downey, Colton, San Bernardino, Ventura, Fresno, Mariposa, Nevada City, Rocklin, Santa Cruz, Los Angeles, Pasadena, and Santa Barbara.

CROUP, twin sister of diphtheria, is reported as having been noticed in Lincoln, Sisson, Truckee, Rocklin, Fort Bidwell, Mariposa, Anaheim, Cloverdale, Ventura, and Los Angeles.

The increase in the reports of these diseases must be attributed to sanitary carelessness in the management of the cases occurring. When once diphtheria has arisen, the law of contagion carries it to the rich and poor without discrimination; to the cleanly and the uncleanly, but not to all alike. Filth fosters the disease, but cleanliness offers no inducement for its propagation. Beware of any person who has a sore throat; do not kiss or absorb the breath of any such. Do not visit the dwelling where diphtheria or croup are present, and above all, do not let your children go where it is. Diphtheria is a preventable disease, and proper sanitary and preventive measures are invariably followed by a limitation of the disorder to the place of its occurrence.

WHOOPIING-COUGH is quite prevalent in Angels Camp, Livermore, Etna Mills, Elsinore, Downey, and College City.

ERYSIPELAS, which is, in a limited sense, contagious, was noticed in Downieville, Salinas, Dixon, Truckee, Igo, Redding, Fort Bidwell, Cedarville, Red Bluff, Tulare, Fresno, and Colfax.

TYPHOID FEVER was quite prevalent during the month of November, and was noticed particularly in San Francisco, Sacramento, St. Helena, Alturas, Lodi, Anaheim, Livermore, Truckee, Etna Mills, Redding, Fort Bidwell, Elsinore, Colton, and Jolon.

The increased prevalence of this disease was not unexpected, as it has invariably taken place after the first rains, probably by the latter washing surface impurities into the drinking water. Dr. Dowling, in a paper read before the New Jersey Sanitary Association, asserted that a careful study of the cases and statistics which he examined seemed con-

clusive that at least 95 per cent of the cases of typhoid fever come directly from impure water. Sanitary care and vigilance are the only means known of preventing the disease, and wherever the slightest suspicion arises of the purity of the water, it ought to be boiled before being used. The good effect of drainage in this disease is remarkably shown in the city of San Diego; before their present complete system of sewerage was established, typhoid fever was very prevalent; now it is becoming more rarely found, and only in those places where drainage is still incomplete.

TYPHO-MALARIAL FEVER is mentioned as having a local habitation and a name in Knights Ferry, Anaheim, Lockeford, Lincoln, Igo, San Bernardino, Tulare, College City, and Fresno.

REMITTENT AND INTERMITTENT FEVERS are noticed in reports from Merced, Lincoln, Knights Ferry, Cottonwood, Rocklin, Wheatland, San Bernardino, Tulare, Newcastle, and other localities.

PNEUMONIA prevails to a great extent throughout the State. The large rainfall, with cold fogs, seems to have increased the frequency of attacks. This was particularly noticed in the valleys and coast counties, as well as above the snow line. It is mentioned in reports from Sisson, North Bloomfield, Truckee, Forest Hill, Nevada City, Igo, Watsonville, Salinas City, San Bernardino, Ventura, Elsinore, Merced, Lodi, Napa, Lockeford, Fresno, Auburn, Sacramento, San Francisco, and Jolon.

BRONCHITIS likewise prevails to a great extent throughout the State, and fortunately in those places where pneumonia is rife, the type appears to be mild and not attended by any unusual mortality, except among the aged and feeble.

INFLUENZA is also universal, but of a mild type.

SMALLPOX is still threatening our State with an epidemic, and if the missing factor in the cause that determines its diffusion were present, we have plenty of the material on hand to produce that result. In San Francisco during the month there were thirteen cases reported, one coming from Illinois, two came from New Mexico, and one from Nevada, the source of supply being quite diffused. In Santa Rosa, Dr. R. P. Smith writes they had four cases on a farm two miles south of the city. The first case came from Oakland. Eleven persons were exposed in the house; three children unvaccinated. They were vaccinated forty-eight hours ahead of the incubative period of smallpox, and all escaped with the very mildest attack of varioloid. None of those exposed, but vaccinated, took the disease. In Merced five cases of smallpox were reported; one died; the type was very mild. Quarantine measures being instituted, it is hoped the disease will not spread, as vaccination of all unprotected persons was at once begun, and will be kept up until each one availing himself of the opportunity is protected.

PACIFIC COAST WEATHER.

SIGNAL SERVICE U. S. ARMY, DIVISION OF THE PACIFIC, SAN FRANCISCO, December 1, 1898. WEATHER.—The storms on the Pacific Coast, during the past month, have been noteworthy for the general absence of high winds, and for the low latitude in which many of them were first observed. To this latter circumstance is due the abundant rainfall in California during the month, and the comparatively small rainfall in the northern districts.

TEMPERATURE.—The mean temperature for the month has been slightly higher than the normal temperature for November in all districts west of the Rocky Mountains. The greatest departure from the normal temperature (averaging about 5 degrees) occurred in northern Nevada, and the least in Washington Territory.

RAINFALL.—The monthly rainfall has been in excess throughout California, and has been less than the normal amount in Oregon and Washington Territory. The marked increase in precipitation, with increased latitude, which is usual on the Pacific Coast, did not appear in November, the rainfall at Los Angeles in the south being nearly equal to that of Portland in the north.

DECEMBER, 1898.

Mortality reports received from seventy-five cities and towns within the State give collectively the number of decedents as nine hundred and seventeen, in an estimated population of seven hundred thousand six hundred, exclusive of those towns reporting *no deaths*, having a population of ten thousand five hundred, so that actually in a population of seven hundred and nineteen thousand one hundred, the mortality gives the exceedingly low percentage of 1.27 per thousand for the month of December, when the death rate is expectedly increased everywhere within the temperate zone. If our mortality reports were reported as they should be, from every village and town in the State, we have no doubt the same condition of diminished mortality would be found. We trust the Legislature will see the importance of so amending our health laws that reliable statistics may be obtained, as by them we can demonstrate clearly the advantages of California as a health resort.

CONSUMPTION caused during the month one hundred and thirty-seven deaths, which is a decrease from last report.

PNEUMONIA was very much less fatal during the month, causing only ninety deaths in December, against one hundred and eight in November, which is quite a decrease.

BRONCHITIS shows a slight increase, thirty-one deaths being attributed to it.

CONGESTION OF THE LUNGS was fatal in eight instances.

DIARRHEA AND DYSENTERY caused only three deaths, which indicates how closely identified these diseases are with atmospheric changes.

CHOLERA INFANTUM caused but three deaths.

DIPHTHERIA continues its fatal tendency, thirty-four deaths being reported during the month. Of these only fourteen occurred in San Francisco, five in Los Angeles, three in Colton, two in Napa, two in Oakland, one each in Alameda, Downey, Petaluma, Sacramento, Santa Ana, Santa Barbara, Santa Cruz, and Vallejo.

CROUP was nearly as prevalent as diphtheria, twenty-two deaths being ascribed to it, seven occurring in San Francisco, four in Sacramento, six in Los Angeles, three in Oakland, one in Downey, and one in Forest Hill.

WHOOPIING-COUGH was fatal in four instances.

SCARLET FEVER caused three deaths—two of them in Sacramento and one in San Francisco.

MEASLES caused no deaths.

SMALLPOX caused two deaths in San Francisco; one also occurred in Stockton, but does not appear in the report from that city.

TYPHO-MALARIAL FEVER.—Four deaths are attributed to this disease.

TYPHOID FEVER caused thirty-six deaths in December, which is a slight increase from last report. Twelve occurred in San Francisco, four in Sacramento, four in Los Angeles, two each in Fresno, Oakland, and Santa Barbara, and one each in Vallejo, Truckee, Sisson, Santa Rosa, San Diego, Redding, Pasadena, Elsinore, and Chico.

REMITTENT FEVER is credited with five deaths.

CEREERO-SPINAL FEVER is reported to have caused seven deaths.

CANCER caused twenty-three deaths.

HEART DISEASE.—Sixty deaths were caused by it.

ALCOHOLISM was fatal to eleven persons during the month.

The following towns report no deaths: Anaheim, Brownsville, Bodie, College City, Cloverdale, Downville, Igo, Lincoln, Lodi, Newcastle, Nicolaus, Roseville, and Williams.

PREVAILING DISEASES.

Reports received from sixty-five towns indicate, with few exceptions, that the amount of sickness is very limited, and what does prevail is of a mild and not a serious character. This may be owing to the favorable temperature throughout the month, which was not characterized by any sudden changes.

DIARRHEA AND DYSENTERY have subsided almost everywhere. Sporadic cases are reported as occurring in Tulare, Fresno, Nicolaus, Lemoore, Anderson, and Downey.

CHOLERA INFANTUM is almost entirely absent from the State, or so seldom met with that it is no longer reported.

MEASLES is reported in Red Bluff, Sisson, Salinas, and Elsinore. The number of cases is very limited, and it is no longer epidemic.

SCARLET FEVER is more widely diffused, but in a very mild form. It was present in Red Bluff, Visalia, Napa, Sacramento, San Francisco, Salinas, Cottonwood, Livermore, Biggs, Anderson, and Cloverdale.

DIPHTHERIA occupies quite an extensive range. It was present in Sacramento, San Francisco, Oakland, Alameda, Colton, Downey, Los Angeles, Napa, Petaluma, Santa Ana, Santa Barbara, Santa Cruz, Vallejo, Tulare, St. Helena, Newcastle, Sisson, Colfax, Igo, Wheatland, Anderson, and Elsinore. Dr. H. N. Miner, writing from Colfax, says that thirteen cases came under his observation during the month, but the type was mild. We have yet to learn upon what factor or factors the type of an epidemic depends, and, again, to what we owe the appearance of certain diseases in regular cycles, appearing and disappearing with a certain regularity that so far has baffled the sanitarian.

CROUP accompanies diphtheria with unfailing regularity, almost compelling us to believe in the identity of the diseases. It was reported in Williams, Anderson, Cloverdale, Downey, Forest Hill, Los Angeles, Oakland, Sacramento, and San Francisco.

WHOOPIING-COUGH was in North Bloomfield, Lodi, Angels Camp, Anderson, Downey, Placerville, and San Francisco.

ERYSIPELAS was observed in Red Bluff, Fresno, College City, Cedarville, Newcastle, Downville, Sierra City, Lincoln, Truckee, and Lockeford.

TYPHOID FEVER was noticed in reports from San Francisco, Tulare, Fresno, Newman, North Bloomfield, Salinas, Wheatland, Cottonwood, Colton, Sisson, Anaheim, Fort Bidwell, Lakeport, Igo, Jolon, Anderson, Bakersfield, Elsinore, Chico, Los Angeles, San Diego, Sacramento, Oakland, Truckee, and Vallejo. The range over which typhoid fever prevails would indicate that sanitary defects exist in these places that ought to be remedied. Typhoid fever is, of all diseases, the most preventable, and if the Sanitary Inspector, which the State hopes to appoint according to law, does nothing but instruct the people how to keep clean and prevent the development of typhoid, he will have earned his salary and saved the State many thousands of dollars.

REMITTENT FEVER is mentioned as prevailing in many places, but its type is not severe and mortality very limited.

PNEUMONIA still prevails to a considerable extent, but is not nearly so prevalent as it was in November.

BRONCHITIS was more frequent in Red Bluff, Sacramento, Fresno, College City, Calistoga, Watsonville, Sierra City, Bodie, Redding, Brownsville, Lockeford, Oakland, Alameda, and San Francisco.

SMALLPOX was in Merced City, but the place is now free from it. There are, however,

three additional cases quarantined in the pesthouse three and one half miles from town. In Mendocino City there is one case only in the pesthouse, now convalescing. In Stockton one case occurred, which came from San Francisco. Since his death no new cases have appeared. In Los Angeles two cases of varioloid were recorded at the pesthouse, which are now convalescent, and no further cases have appeared in the city. In San Francisco they had a few cases that were promptly isolated. No new case has appeared since December 29, 1888. No further reports of this disease have been recorded.

PACIFIC COAST WEATHER.

WEATHER.—Less than the usual number of storms appeared on the Pacific Coast during December, but those, as a rule were well defined, and occurred in lower latitudes than usual. As a result, the number of days in which rain fell has been slightly in excess of the normal number in California, while in Oregon and Washington Territory there has been an unusual amount of fair weather.

TEMPERATURE.—The mean temperature for the month was slightly above the normal December temperature in all the Pacific Coast districts. The departures were small in all cases, however, the greatest, 4 degrees, occurring in southern Oregon. Mean monthly temperatures at selected stations are as follows: Olympia, W. T., 42 degrees; Portland, Or., 44 degrees; Roseburg, Or., 46 degrees; Red Bluff, Cal., 43 degrees; Sacramento, 43 degrees; San Francisco, 52 degrees; Los Angeles, 55 degrees.

RAINFALL.—In California the rainfall has been in excess of the December rainfall, while in Oregon and Washington Territory it has amounted to but little more than one half the usual amount, except in eastern Washington Territory and northeastern Oregon, where the departures from the normal are small.

JANUARY, 1889.

Reports of mortality received from sixty-six cities and towns, with an estimated population of seven hundred thousand eight hundred and fifty, give the number of deaths as nine hundred and ninety-two, being a percentage of 1.41 per thousand in the month, or an annual death rate of 16.92, which is an increased percentage over the mortality of several previous months. The increased deaths from diseases of the respiratory organs will, in a measure, account for the increase, deaths from zymotic disease being rather below the usual average.

CONSUMPTION.—Deaths from this disease reach one hundred and sixty-five, an increase of twenty-eight over the month of December.

PNEUMONIA was very fatal, one hundred and three deaths being attributed to it.

BRONCHITIS also shows an increased death rate, thirty-four decedents from it being reported during the month.

CONGESTION OF THE LUNGS caused the death of twelve persons, which is also an increase, so that we are warranted in attributing our augmented death rate to local more than to general sickness.

DIARRHŒA AND DYSENTERY were fatal in seven instances.

CHOLERA INFANTUM again appears in our reports, six deaths being attributed to it.

DIPHTHERIA is reported to have caused twenty-one deaths. Of these, four occurred in San Francisco, six in Oakland, three in Santa Cruz, two in Colfax, and one each in Los Angeles, Elk Grove, Ventura, Stockton, Mendocino, and San Bernardino.

CROUP was more fatal than diphtheria, twenty-two deaths being ascribed to it. Of these, two occurred in Vallejo, eight in San Francisco, five in San Leandro, and one each in Los Angeles, Santa Barbara, Riverside, Oakland, Fresno, Anaheim, and Alameda.

WHOOPING-COUGH caused seven deaths.

SCARLET FEVER was fatal in one instance.

MEASLES caused no deaths.

SMALLPOX caused two deaths in San Francisco and one death in San Leandro during the month. No other deaths from it were reported.

TYPHO-MALARIAL FEVER was fatal in one instance.

TYPHOID FEVER is reported as the cause of twenty-nine deaths. This is a decrease from the mortality in December, San Francisco reporting only six deaths, Los Angeles reports six deaths, Santa Ana three, Mendocino three, Jolon two, and Anaheim, Bakersfield, Colton, Lodi, Oakland, Placerville, Santa Barbara, St. Helena, and Vallejo, one each.

REMITTENT FEVER caused three deaths, one in Placerville, one in San Bernardino, and one in Pasadena.

CEREBRO-SPINAL FEVER is credited with eleven deaths, which is an increase over last report. Four of these occurred in Stockton, two in Oakland, and one each in San Francisco, Lemoore, Mendocino, Redding, and Santa Cruz.

CANCER was fatal in twenty-eight instances, which is about the monthly average.

HEART DISEASE caused seventy-one deaths, which is an increase over last month.

ALCOHOLISM.—Eleven deaths were attributed to this cause.

The following towns report *no deaths* during January: Anderson, Biggs, Igo, Gonzales, Livermore, Newcastle, Sisson, and Elsinore.

PREVAILING DISEASES.

Reports received from seventy-two different localities are unanimous in reporting the absence of any noticeable amount of sickness beyond that which might be expected in the natural course of events. The weather during the month presenting no sudden changes, and the rainfall below the normal, the effect upon the type of diseases was most favorable, especially those confined to the alimentary canal, as we find that—

DIARRHŒA AND DYSENTERY are not mentioned as prevailing in any district. Some sporadic cases were noticed in Anderson, Lemoore, Fresno, Nicolaus, and College City. The type was quite mild and amenable to simple treatment.

CHOLERA INFANTUM is not mentioned in a single report received, which shows its general absence within the State, or at least in such a limited number of cases that its presence is not noteworthy.

MEASLES is reported in Merced and Newman in limited numbers and in mild form.

SCARLET FEVER was noticed in Sacramento, Napa, Anderson, Truckee, and Santa Ana. The type was mild, and the numbers attacked were very limited.

DIPHTHERIA is reported in various localities. In San Francisco it was not so prevalent during the month. It was quite frequently noticed in Oakland, Alameda, Elsinore, San Leandro, Santa Cruz, Fresno, Napa, Colfax, Truckee, Anderson, St. Helena, Igo, Etna Mills, Elk Grove, Los Angeles, Mendocino, San Bernardino, Stockton, and Ventura. The impression seems to be very general that the frequency of this disease is in the main dependent upon bad sewerage, defective drains, foul air, and unsanitary conditions generally. Although these conditions may render the persons exposed to them more liable to take the disease from the deteriorating influence upon the general health which such surroundings produce, yet they do not generate diphtheria, nor is the disease capable of spontaneous generation any more than is smallpox or cholera. In order to produce diphtheria you must have the germ of the disease present, and then to be developed it must come in contact with a suitable soil for its growth. From this fact the inference is plain that although prudence requires that the sanitary condition of the patient's surroundings be kept in the best possible condition, and all predisposing causes which might deteriorate the patient's health be removed, it is infinitely more important to insist upon the complete isolation of those attacked, and the rapid destruction by fire of all substances likely to be the conveyancers of contagious germs. Diphtheria germs, as far as can be ascertained, are aerobic; they are carried in the air, exhaled by the breath, deposited on the clothes, on the walls, everywhere in the room; hence the necessity for the most thorough disinfection of the person and the dwelling before intercourse with well persons is allowed. If more care were exercised in this regard we would hear less of the disease, and many very valuable lives saved that are now sacrificed by criminal carelessness, and the utter disregard for the public welfare.

CROUP prevailed co-extensively with diphtheria, and wherever the one was noticed the other was in close proximity. There is no doubt of the identity of these diseases when the croup is of the membranous form, and the same precautions ought to be taken to prevent its diffusion as are proper and requisite in diphtheria. There is a fair chance of recovery in diphtheria, but membranous or diphtheritic croup is nearly always fatal; hence the urgent necessity of taking every precaution to prevent its spread by proper disinfection.

WHOOPING-COUGH is reported in Lodi, Elsinore, Anaheim, North Bloomfield, Los Angeles, Placerville, and San Francisco.

ERYSIPELAS.—Sporadic cases of this disease were reported in Sacramento, College City, Fresno, Truckee, Anderson, Bodie, St. Helena, Igo, Cottonwood, Sisson, Downieville, Newman, Los Angeles, Ventura, and San Francisco.

TYPHOID FEVER is noticed in reports from Anaheim, Bakersfield, Colton, Jolon, Lodi, Los Angeles, Mendocino, Oakland, Placerville, San Francisco, Santa Ana, Santa Barbara, St. Helena, Vallejo, Etna Mills, Cottonwood, Igo, Truckee, and Fresno. As this disease is in truth a filth disease, and is propagated in foul air, sewer gas, and all emanations from decomposing animal matter, its presence is surely indicative of a lack of sanitary care in the place developing it. No sanitary improvement worth the name will, however, be effective, unless you can create an intelligent interest in the matter among the people at large. You cannot make populations cleanly or healthy against their will, or without their intelligent coöperation.

PNEUMONIA was quite prevalent during the month, and is mentioned in reports from Dixon, San Bernardino, College City, North Bloomfield, Colton, Fresno, Merced, Newman, Napa, Lockeford, Lemoore, Watsonville, Colfax, Truckee, Anderson, Igo, Cottonwood, Etna Mills, Wheatland, Elk Grove, Sacramento, San Francisco, San Diego, Santa Ana, Santa Rosa, Placerville, Oakland, Marysville, Los Angeles, Grass Valley, and Berkeley.

BRONCHITIS likewise prevailed more or less over the State. Its type was not severe.

INFLUENZA prevails extensively, accompanied by a great deal of bronchial catarrh. Apart from the great prostration induced, its type is not severe.

SMALLPOX still appears here and there throughout the State. There were some cases reported during the month in San Francisco. A case was also reported five miles below St. Helena. Dr. Dawson says no others have occurred. A case was also detected in Oakville, near Napa; three cases developed in Merced. One case is about two miles from San Leandro, in the poorhouse, and in one family no fewer than eleven persons had the disease. Dr. Dubois writes that these people, who were under his care, came from Milwaukee, and the disease was contracted on the way to California. Of these eleven, one died; the others are now convalescent. A case was also discovered in Placerville, which was promptly

isolated and quarantined, so that an extension of the disease is not anticipated. These isolated cases indicate that smallpox germs are well scattered over the State, and require simply suitable soil for their cultivation and development. Vaccination should be generally adopted in every city, town, and village in the State, as the season is now favorable for disease germs to propagate, and there is no knowing how soon an epidemic may ensue. By efficient vaccination this can be avoided and smallpox shorn of its strength. No delay should be exhibited in this matter, which is one of vital importance.

PACIFIC COAST WEATHER.

WEATHER.—Fair weather has prevailed during the month to an unusual extent along the entire Pacific Coast. Rain fell at regular intervals in Oregon and Washington Territory until the twenty-fourth of the month, being followed by an entire week of clear weather. In California rain fell as follows: In Northern California, on the 3d, 4th, 10th, 11th, 12th, 17th, 20th, and 21st. In Southern California, on the 5th, 12th, 13th, 14th, 15th, and 16th.

TEMPERATURE.—The mean temperature of the month has been about normal in all districts, being slightly higher than usual along the immediate coast, and slightly lower than usual over the interior. Mean temperatures at selected stations are as follows: Portland, Oregon, 39 degrees; Roseburg, Oregon, 41 degrees; Red Bluff, California, 46 degrees; Sacramento, 55 degrees; San Francisco, 49 degrees; Fresno, 44 degrees; Los Angeles, 51 degrees, and San Diego, 52 degrees.

RAINFALL.—The rainfall has been less than usual in all districts, markedly so, except in the extreme southern portion of California, where it was very nearly normal.

FEBRUARY, 1889.

Mortality reports have been received from sixty-seven localities, with an estimated population of six hundred and sixty-five thousand seven hundred. The total number of deaths reported was eight hundred and fifty-nine, which gave a percentage of 1.29 per thousand in the month, or an annual death rate of 15.48, which is an unusually small percentage for the season of the year, and indicates the absence of any epidemic disease upon the coast.

CONSUMPTION is credited with one hundred and sixty-five deaths, the same number that occurred in January, and an increase over the general average. The possibility of lessening our mortality from this disease, by preventive measures, will be presented in another portion of these remarks.

PNEUMONIA caused ninety-two deaths, which is a decrease from last report, but indicates a great frequency of the disease and severity of type.

BRONCHITIS was fatal in twenty-two instances. These deaths, with but one exception, occurred in the coast counties.

CONGESTION OF THE LUNGS caused seven deaths; mostly among children.

DIARRHŒA and DYSENTERY are credited with five deaths; three of them in San Francisco, one in Downey, and one in Monterey, which indicates the infrequency of these diseases at the present time.

CHOLERA INFANTUM caused four deaths, all sporadic in nature, and occurring each one in different sections of the State.

DIPHTHERIA is reported as causing thirty-two deaths, an increase of one third over those of January. Of these, ten occurred in San Francisco, six in Los Angeles, four in Downey, three in Oakland, three in St. Helena, two in Colfax, and one each in Ventura, Truckee, Santa Barbara, and Sacramento.

CROUP had also a fatality of eleven cases, which is a decided decrease from last report. Five of these occurred in San Francisco, two in Downey, two in Ventura, and one each in Anaheim and Oakland.

WHOOPING-COUGH was fatal in but one instance, and that in Oakland.

SCARLET FEVER caused one death in Oakland.

MEASLES caused one death in San Francisco.

SMALLPOX caused one death in San Francisco. No other deaths from it were reported.

TYPHO-MALARIAL FEVER was fatal in one instance only.

TYPHOID FEVER had also the small mortality of twenty-one. Of these, ten occurred in San Francisco, three in Los Angeles, three in Davisville, two in Santa Barbara, and one each in Anaheim, Oakland, and Sacramento.

REMITTENT FEVER is credited with one death.

CEREBRO-SPINAL FEVER.—To this cause is attributed fourteen deaths. Four occurred in San Francisco, one each in Biggs, Cottonwood, Cloverdale, Grass Valley, Gridley, Riverside, Sacramento, Sisson, Stockton, and St. Helena, which is an increased mortality over January.

CANCER caused twenty-six deaths, which is about the average monthly mortality.

ERYSIPELAS was fatal in four instances.

HEART DISEASE caused sixty-one deaths.

ALCOHOLISM was fatal in ten instances.

The following towns report *no deaths* in February: Bodie, Downieville, Elk Grove, Elsinore, Igo, Lower Lake, Millville, Monrovia, National City, Newman, Shasta, and Trinity.

PREVAILING DISEASES.

Reports received from seventy-five localities in different parts of the State indicate an unusual absence of sickness, with the exception of pulmonary diseases, which are rather prevalent in many places, especially influenza, which seems to be almost universal. As it has no very dangerous tendency, and depends more on meteorological conditions than infection for its diffusion, it can hardly be included among the zymotic diseases.

PNEUMONIA is noted in reports from Gridley, Lockeford, San Bernardino, Elsinore, Monrovia, Elk Grove, Sacramento, Downieville, Millville, Cottonwood, Anderson, Sisson, Ione, Lemoore, Merced, Fresno, Calico, Watsonville, Napa, Alameda, Bakersfield, Colton, Grass Valley, Oakland, Salinas, San Diego, and San Francisco. In Placerville, Dr. J. Q. Wrenn writes that pneumonia has almost been epidemic, many cases being of a marked typhoid character, which much increased its fatality. Its frequency is now abating, and influenza becoming more frequent. The disease was also quite prevalent in San Francisco and along the coast.

BRONCHITIS is noted in the reports quite frequently, especially in Lockeford, Lakeport, Newcastle, Cloverdale, Anaheim, Cottonwood, Williams, Wheatland, Lemoore, Bodie, Brownsville, Downey, Fresno, Monterey, Merced, Sisson, Truckee, Biggs, Napa, Ione, Watsonville, Fort Bidwell, Los Angeles, Oakland, and San Francisco.

WHOOPING-COUGH is prevalent in Oakland, Newcastle, Brownsville, Santa Cruz, Merced, and Downey. The type is mild and the mortality very limited.

DIARRHŒA AND DYSENTERY cannot be said to prevail anywhere. A few cases occurred in Red Bluff, Fresno, Calico, Monterey, Ione, Knights Ferry, Lemoore, Downey, and San Francisco.

CHOLERA INFANTUM is also almost absent from the State. Sporadic cases occurred in Monterey, San Francisco, San Diego, Redding, Oakland, Merced, and Ione. In other reports it is not mentioned. As spring advances and the temperature increases we may expect a return of the disease to our sickness reports, until such time as mothers become familiar with household hygiene, when we hope to see the affection disappear from our list of prevailing diseases.

MEASLES was noticed in reports from Gridley, Merced, Sisson, and Oakland.

SCARLET FEVER, in a mild form, was present in Sacramento, San Francisco, Chico, Calico, Fresno, Lockeford, Santa Cruz, Ione, Igo, Biggs, Napa, and Oakland.

DIPHTHERIA continues to be reported in Los Angeles, Ventura, Anaheim, Downey, San Bernardino, Salinas, Fresno, Napa, St. Helena, Santa Cruz, Truckee, Millville, Etna Mills, Anderson, Oakland, and San Francisco. In the latter city thirty-four cases were reported during the month, which is a decrease. The importance of isolation in these cases is beginning to attract the notice of the public, and when we consider that the disease is almost as contagious as smallpox, and twice or perhaps three times as fatal, too much care cannot be taken in confining the disease within as narrow a compass as possible.

CROUP is now generally considered, in the membranous form, to be identical with diphtheria elsewhere. In our reports it is noticed in San Bernardino, Cloverdale, Anaheim, Knights Ferry, Downey, Colfax, Fresno, and other places where diphtheria prevails. In all cases it should be treated as an infectious disease, and precautions taken accordingly.

ERYSIPELAS, another zymotic disease, is mentioned in reports from Lockeford, Millville, Anaheim, Truckee, Brownsville, Lower Lake, Downey, Calico, Fresno, Oakland, and San Francisco. The type is mild.

TYPHOID FEVER is not prevalent anywhere. Sporadic cases are noticed in San Francisco, Oakland, Sacramento, Anaheim, Davisville, Los Angeles, Santa Barbara, Gridley, Monrovia, Igo, Brownsville, Etna Mills, Red Bluff, and Cottonwood.

SMALLPOX is abating in a very gratifying manner. In San Francisco there was but one case during the month of February. Dr. Wrenn, writing from Placerville, reports that five cases occurred during the month. These all seemed to have originated from a lady who died after a few days' illness with what was supposed to be pneumonia; it was more likely hemorrhagic smallpox, as the first one taken with undoubted variola was her son, and soon after the priest who attended her was stricken with confluent smallpox. Although many persons were exposed to the disease, it has not spread, vaccination being at once resorted to. One case was reported in or near Stockton. There was also a case reported by Dr. O. Barton, of Truckee, in the person of a colored waiter, who had come ten days before from Carson. He was waiting at dinner when the pustules were noticed upon him. He was at once isolated and quarantined. In Merced, two cases were reported as convalescing. No other reports of smallpox have been received.

CONSUMPTION.—In view of the wide distribution of this disease, unconfined to any one portion of the State, but being particularly noticed in the southern portion, from the large immigration of these sufferers to that genial climate, it is deemed of importance to give the conclusions of Dr. G. Cornet upon the infectiousness of the disease. His researches show conclusively that the virus of consumption is not ubiquitous, but arises and remains concentrated about phthisical patients. A consumptive patient only becomes dangerous when the most elementary rules of hygiene are neglected. Of the discharges from a consumptive patient, it is only the sputum which is dangerous. The expectoration, as long as it is moist, is devoid of danger. If the sputum is spat into spitting cups, there is no risk. The cup should be kept covered, except when in use, not to prevent evaporation, but to keep out flies, which have been known to carry the virus about on their feet. The great danger arises when the patient expectorates on the floor

or in a handkerchief. In these cases, the sputum dries, is pulverized, and carried about by the winds, and if inhaled by a person susceptible to the disease, will undoubtedly produce the effects of *inoculation*. Dr. Cornet is also of the opinion that the patient is, by indiscriminate expectoration, even more dangerous to himself than to his surroundings; that he can poison himself, and that the inhalation of a few bacilli more, and consequent starting of a fresh foci of disease in his lungs, may determine the speedy end of his life. From these remarks it can be seen how very important it is that the expectoration of all consumptives should be speedily disinfected, especially in hotels, pleasure resorts, and sanitariums, which invalids seek for health's sake. Until this is methodically and effectually done, we can hope for no advance in the limitation of a disease which is preventable, and which, Dr. Cornet says, kills one seventh of the entire population.

PACIFIC COAST WEATHER.

WEATHER.—Few storms appeared on the Pacific Coast during the month, and these were, as a rule, of short duration, and were accompanied by little precipitation. Rain fell in Oregon and Washington Territory on the 13th, 14th, 15th, 17th, 18th, 19th, 20th, 23d, and 27th; in Northern California on the 6th, 15th, 16th, 17th, 23d, and 25th, and in Southern California on the 14th, 15th, 16th, 24th, and 25th.

TEMPERATURE.—The mean temperature was higher than the average February temperature at all stations on the Pacific Coast, departure from the normal temperature being about six degrees for stations in Oregon and Washington Territory, and about three degrees for those in California. Mean monthly temperatures at selected stations were as follows: Portland, Or., 44 degrees; Roseburg, Or., 45 degrees; Red Bluff, Cal., 52 degrees; Sacramento, Cal., 50 degrees; San Francisco, 52 degrees; Fresno, Cal., 50 degrees; Los Angeles, Cal., 55 degrees; San Diego, Cal., 55 degrees.

RAINFALL.—The rainfall was markedly below the normal February rainfall in all districts, the departures ranging from about seven inches in the vicinity of Puget Sound to about one inch in the extreme southern part of California. At all stations in the western part of Oregon and Washington Territory the rainfall was less than that for any February since the commencement of observations. The rainfall, though light, was well distributed, both as regards the territory covered and in time, thus securing the maximum benefit to growing crops.

MARCH, 1890.

Reports of mortality received from seventy-four localities, with an estimated population of seven hundred and forty-one thousand five hundred, give, in the aggregate, nine hundred and seven deaths, which is a percentage of 1.24 per thousand in the month, or an annual death rate of 14.88 per annum. If we compare this percentage with that of any other State within the Union, we will at once begin to realize the salubrity of our climate and the lessened tendency to death that exists within its borders. There is hardly a State that can be named whose death rate for the month of March comes within 1 per cent of our average, and when we reflect that 1 per cent means ten thousand lives spared in each million persons per annum, we no longer wonder at the large number of immigrants that seek our shores.

CONSUMPTION caused the death of one hundred and fifty-seven persons, or nearly one sixth of the total mortality for the month; nearly all occurring in those who came into the State already suffering from the disease.

PNEUMONIA was fatal in seventy-six instances, which is a large decrease from the last report, but nevertheless indicates a great frequency of the disease.

BRONCHITIS is reported to have caused nineteen deaths, which also shows a decrease.

CONGESTION OF THE LUNGS is credited with seven deaths.

DIARRHOEA AND DYSENTERY were fatal in but two instances.

CHOLERA INFANTUM.—Five deaths are reported from this disease.

DIPHTHERIA was fatal in twenty-three instances. Of these, only eight occurred in San Francisco, three in Oakland, three in Los Angeles, two in Downey, two in Grass Valley, and one each in Auburn, Castroville, Salinas City, Mendocino, and Nevada City. The deaths from this disease are more numerous than from any other zymotic disease upon the coast, showing sanitary carelessness somewhere.

CROUP had a fatality of seven—four in San Francisco, one in Los Angeles, one in Cloverdale, and one in Oakland.

WHOPING-COUGH caused four deaths, which is an increase over last report.

SCARLET FEVER was fatal in eight cases—two in San Francisco, two in Oakland, two in Fresno, one in Nevada City, and one in Santa Ana.

MEASLES caused five deaths during the month.

SMALLPOX.—No deaths were reported from this disease.

TYPHO-MALARIAL FEVER was fatal in but two instances.

TYPHOID FEVER had the remarkably small mortality of eighteen persons credited to it during the month.

REMITTENT AND INTERMITTENT FEVERS caused no deaths.

CEREERO-SPINAL FEVER.—To this cause is attributed four deaths, all sporadic, and in different sections of the State.

CANCER had its usual average mortality of twenty-five.

ERYSIPELAS was fatal in three instances.

HEART DISEASE is credited with the large mortality of eighty-six.

ALCOHOLISM was fatal in five instances.

The following towns report *no deaths* in March: Bodie, Dixon, Downieville, Livermore, Wheatland, North Bloomfield, Rocklin, Roseville, Lincoln, and Georgetown.

PREVAILING DISEASES.

Reports of sickness from seventy-nine localities show a remarkable absence of any epidemic, or indeed of any very prevalent disease, if we may except pneumonia, bronchitis, and influenza, which were very general in their diffusion, but of a mild type and sporadic character. The temperature of the month being much warmer than what we usually experience in March, and the rainfall being somewhat in excess, may have had a modifying influence upon the character of these diseases, as it has been conclusively shown that the prevalence of coughs, colds, bronchial and rheumatic affections depend very much upon temperature—a very moist atmosphere accompanied by a low temperature being conducive to their frequency, an increase of temperature lessening their fatality. It was noticed during the month that when the atmosphere was dry, and the temperature low, an increase of acute pneumonia was developed, and in the higher altitudes it seemed to determine its fatality. The connection between meteorological conditions and disease is still a problem to be solved, and appears to be worthy the attention of every votary of science whose mission is to consider all the influences affecting the public health.

PNEUMONIA is mentioned in reports from Sacramento, San Francisco, Oakland, Vallejo, Dixon, Downieville, Napa, Castroville, Anderson, Redding, Lakeport, Tulare, Merced, Hanford, Angels Camp, Etna Mills, Fort Bidwell, College City, Fresno, Cloverdale, Chico, Oroville, Santa Ana, San Diego, Grass Valley, and Red Bluff, where Dr. John Fife noticed it was very prevalent.

BRONCHITIS was also noted by its frequency in Downey, Williams, Lodi, Lemoore, Wheatland, Redding, Tulare, Salinas, College City, Fresno, Cedarville, Los Angeles, Brownsville, and San Francisco.

WHOOPING-COUGH is observed in Lodi, Tulare, Angels Camp, Brownsville, Fresno, Oakland, and Auburn, where Dr. Rooney writes it prevails extensively.

CHOLERA INFANTUM is almost absent from the State. A case or two was observed in Knights Ferry, Lemoore, Napa, and Sacramento. The frequency of this disease depending more upon alterations of temperature, and especially upon a continuous high temperature, we would not expect a very great prevalence of it at this season of the year.

DIARRHŒA AND DYSENTERY are also mentioned but seldom in the monthly reports. There were some cases observed in Wheatland, Lemoore, Tulare, Etna Mills, Fresno, Red Bluff, Gridley, Colton, and San Diego; but, generally speaking, it is not at all a prominent disease in the State at present.

MEASLES.—A few cases of this disease were noticed in Lincoln, Wheatland, Truckee, Livermore, Angels Camp, Etna Mills, and Oakland.

SCARLET FEVER was present in Igo, Ione, Tulare, Salinas, Dixon, Oakland, San Francisco, Fresno, Santa Ana, and Sacramento. As the tendency to infection from this disease lessens with advancing years, the longer a child can be protected from it the greater the likelihood that it will escape it entirely. To obtain this desirable end it is absolutely necessary to isolate patients as soon as the disease is discovered; and this isolation must be maintained until the shedding of the epithelium or outer skin is completed. It is a well known fact that scarlet fever patients are most dangerous to others when the skin is beginning to desquamate, or peel off. During this time they should be frequently bathed, and their skin afterwards anointed with fresh lard, or other animal oil, which will hinder the dissemination of the branny scales. Children exposed to scarlet fever should remain under observation ten or twelve days before being allowed to mingle with other children, and all attendants on the sick should change their garments, and disinfect their hands, face, and hair by washing in a disinfectant solution before mixing with the public. It must not be forgotten that the type of the disease in one person is not certain to reproduce the same in another, as what is so mild as scarcely to confine to bed in one person, may communicate a poison to another that will be so very malignant as to cause death in a few hours. It is, therefore, the part of prudence to confine the spread of the disease to within as small a radius as may be possible. To determine the most infective period of the disease, Dr. Whitledge, of London, analyzed one thousand seven hundred cases, of which he had exact particulars, and found the infectiveness suddenly decreased at about the sixth day, increased again about the twelfth day, and reached its maximum on the sixteenth day.

DIPHTHERIA continues to be noted in several localities, but in no place has it assumed epidemic proportions. In San Francisco twenty-two cases were reported during the month, which indicates a marked decrease in the frequency of the disease there. It is also reported in Auburn, Castroville, Cloverdale, Colfax, Truckee, Redding, Anderson, Downey, Tulare, Salinas City, St. Helena, Grass Valley, Los Angeles, and Oakland. In many of these localities the cases were returned as *croup*, which are here included in the term diphtheria, modern experimental pathology tending unequivocally to show their identity. Many of our reports mention a prevalence of sore throat, which may be or may not be diphtheritic, as it is now ascertained that the presence of a membrane is not essential to constitute a true diphtheria, it being many times expressed without its local manifestation in the throat, but apparent in the swollen cervical glands.

ERYSIPELAS is mentioned as appearing in sporadic form in Downey, Truckee, Lemoore, Tulare, College City, Cedarville, Oakland, and San Francisco.

TYPHOID FEVER is not prevalent in any locality. Our reports for the past month are singularly free from its mention. In San Francisco and Oakland a few cases are noted; also in Alameda, Etna Mills, Colfax, Los Angeles, and Red Bluff.

TYPHO-MALARIAL FEVER was observed in Cottonwood, Lodi, Anderson, Igo, Tulare, College City, Fresno, Knights Ferry, and Gridley. The type was very mild and the mortality nominal.

SMALLPOX still continues to show itself here and there within the State. In San Francisco three cases were reported, one of whom came from Portland, Oregon, one from San Rafael, and one from Sacramento. In Hanford, Tulare County, a case appeared on the fifteenth of the month. This was followed by two others in the same dwelling; all were of the confluent variety; no other cases have as yet developed. There is one case in Truckee, which is convalescing. Dr. J. Q. Wrenn writes that the disease has entirely disappeared from Placerville, and Dr. C. A. Ruggles assures us that there is not a single case in Stockton or vicinity. No other reports of smallpox have been received, and we hope soon to record the fact that it is absent from the State.

PACIFIC COAST WEATHER.

WEATHER.—From the seventh to the twentieth of the month a rapid succession of storms appeared, giving rain along the entire Pacific Coast. These storms were accompanied in many cases by high winds, noticeable on the days from the twelfth to the eighteenth. During the periods preceding and following this series of storms, warm, fair weather prevailed, broken by occasional showers.

TEMPERATURE.—The month has been much warmer than usual over the country west of the Rocky Mountains. The greatest departures from the normal temperature occurred in central Oregon, where there were about 8 degrees. In California the mean monthly temperature ranged from 3 degrees to 4 degrees above the normal. Mean temperatures at selected stations were as follows: Portland, Oregon, 53 degrees; Roseburg, 52 degrees; Red Bluff, California, 57 degrees; Sacramento, California, 56.5 degrees; San Francisco, California, 55.5 degrees; Fresno, 57 degrees; Los Angeles, 56.5 degrees; San Diego, 57.6 degrees.

RAINFALL.—Throughout California the rainfall for the month was greatly in excess of the usual amount, the greatest excess being found along the coast of Central California, and the least in the lower San Joaquin Valley. In Oregon and Washington Territory, the rainfall has been light, the greatest departures from the normal amount occurring near the Columbia River.

APRIL, 1899.

Reports received from seventy-two different localities, with an estimated population of seven hundred and one thousand nine hundred and fifty, give a mortality of eight hundred and thirty-five, which is a percentage of 1.18 per thousand in the month, or an annual mortality of 14.16, which is the lowest annual percentage at which we have yet arrived, indicating a remarkably good condition of the public health throughout the State.

CONSUMPTION, as usual, heads the list of decedents with one hundred and thirty-eight, which, however, is a decrease from the number reported last month.

PNEUMONIA shows how rapidly its frequency is abating by recording only forty-five deaths in April, as against seventy-six in March. This rapid decrease in fatality is in a great measure due to the favorable weather during the month, which was warm and pleasant, without any extremes of temperature.

BRONCHITIS caused twenty-one deaths, the majority occurring in the very young or the very old.

CONGESTION OF THE LUNGS is reported as having caused seven deaths.

DIARRHEA AND DYSENTERY, although increasing very much in frequency, are not increasing in fatality in the same ratio, eight deaths only being attributed to them. Of these, four occurred in one town from dysentery.

CHOLERA INFANTUM again claims attention by its death rate, fifteen deaths being ascribed to it during the month.

DIPHTHERIA was fatal in nineteen instances, which is a decrease from last report. Eight of these occurred in San Francisco, five in Oakland, and one each in Colfax, Grass Valley, Vallejo, Pasadena, Los Gatos, and Santa Barbara.

CROUP is credited with six deaths, three in San Francisco, two in Los Angeles, and one in Nevada City.

WHOOPING-COUGH is credited with six deaths.

SCARLET FEVER caused four deaths—two in San Francisco, and one each in Santa Ana and San Diego.

MEASLES was not fatal in a single instance.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER caused but two deaths.

TYPHOID FEVER was fatal in twenty-three instances, a slight increase over last month's fatality from this cause.

REMITTENT AND INTERMITTENT FEVERS are reported to have occasioned four deaths.

CEREBRO-SPINAL FEVER.—Nine deaths were reported from this disease; one in Chico, one in Ione, one in Sacramento, one in San Diego, two in San Francisco, and three in San Bernardino.

CANCER caused thirty-two deaths, a slight excess over the usual mortality.

ERYSIPELAS was fatal in four cases.

HEART DISEASE caused seventy-one deaths.

ALCOHOLISM was fatal in one instance.

The following towns report *no deaths* during the month: Alturas, College City, Cottonwood, Etna Mills, Gonzales, Igo, Lincoln, Lower Lake, Roseville, North Bloomfield, Redding, Sisson, Shasta, Wheatland, and Downieville.

PREVAILING DISEASES.

Reports of sickness received from eighty different localities indicate a minimum amount of disease in the various towns heard from, many of the towns reporting no sickness whatever. These intimations of an absence of any prevailing disease at this season of the year is gratifying to the sanitarian as an indication of the progress that sanitary science is making in the State; we believe that it is rapidly becoming a settled conviction in the public mind that without cleanly homes and surroundings good health cannot be maintained. With the advent of the new law compelling the organization of a Board of Health or the appointment of a Health Officer in every town of five hundred or more inhabitants, we expect a sanitary movement throughout the State that will not permit any town to abide in filth, and take its chances of Providence averting an epidemic that its own unsanitary condition has invited. Through these officers we hope to find many diseases entirely prevented from passing beyond their original place of development, and no disease allowed to attain to any epidemic proportions if sanitation can prevent it.

PNEUMONIA.—The warm weather experienced during the month of April seems to have had a salutary influence in diminishing the frequency of this disease. We find it noted in reports from Oakdale, Gridley, Downey, Merced, Lockeford, Hollister, Truckee, Red Bluff, College City, Fresno, Newman, Santa Barbara, Napa, Oakland, Chico, and San Francisco.

BRONCHITIS in a mild form was also noticed in Oakdale, Sisson, Downey, Lockeford, Dixon, Cottonwood, Brownsville, College City, Etna Mills, Fresno, Bakersfield, Stockton, Oakland, San Francisco, and Sacramento.

WHOOPING-COUGH was prevalent in Knights Ferry, Lodi, Ione, Oakdale, Placerville, Sacramento, Newman, Auburn, Fresno, San Francisco, and Santa Barbara.

CHOLERA INFANTUM is mentioned as appearing during the month in Lodi, Fresno, Grass Valley, Hanford, Oakland, San Diego, San Francisco, Santa Ana, and Santa Barbara. The cases were not numerous.

SCARLET FEVER, in quite a severe form, was noticed in Hanford. It was also present in San Francisco, Fresno, Elk Grove, San Diego, and Santa Ana.

DIARRHOEA and **DYSENTERY** are again occupying a place among the "prevailing diseases," and were present in Sacramento, Oakland, San Francisco, Colton, Knights Ferry, Oakdale, Downey, Igo, Merced, Red Bluff, College City, Fresno, Hanford, and Alameda.

SMALLPOX.—There was one case of smallpox in San Francisco and one case in Hanford developed during the month. Both are now convalescent. In Hanford no new cases have appeared, and quarantine has been raised. Dr. Davidson thinks that they will have no further trouble with it.

MEASLES appeared in Sisson, Cottonwood, Merced, Etna Mills, Lodi, Fresno, and Benicia. The type is very mild, and the extent of the disease limited.

DIPHTHERIA was noted in many places during the month. In San Francisco twenty-five cases were reported, which is about the same as last month. Sporadic cases also appeared in Sisson, College City, Fresno, Colfax, Grass Valley, Oakland, Vallejo, and Santa Barbara.

PAROTIDITIS, OR MUMPS, was present in Sacramento and Fresno in a limited number of cases.

ERYSIPELAS was reported in Gridley, Oakdale, Downey, College City, Fresno, Sacramento, Colfax, Lodi, Brownsville, and San Francisco. The type was exceedingly mild, and the fatality extremely limited.

TYPHOID FEVER is not prevailing, according to reports received. A case or two was noted in Red Bluff, St. Helena, Etna Mills, Fresno, Lodi, Bakersfield, Oakland, Pomona, Stockton, Sacramento, and San Francisco.

MALARIAL FEVERS are noticed in our reports with increasing frequency as the warm weather approaches. To the present time they offer no evidence of malignancy, the mortality being exceedingly limited. Many of these cases of fever can be prevented by a little attention to the surroundings of our dwellings; in seeing that no garbage or decomposing vegetable matter be allowed to decay in the cellar or outhouses; that the sewers are kept clear, to allow all the surface water to be freely drained from our doors; by having cellars and outhouses thoroughly cleaned and whitewashed; and by being a little particular as to the source of water supply.

PACIFIC COAST WEATHER.

The month has been marked by the absence of storms accompanied by dangerous winds. Copious showers have fallen during the month in Oregon, Washington Territory, and Northern California, and light showers in Central California. The temperature has been much higher than usual in all districts.

MAY, 1889.

Reports received from seventy-eight towns, with an estimated population of seven hundred and twenty-five thousand four hundred and fifty, give a total mortality of eight hundred and eighty-five, which is a percentage of 1.22 per thousand in the month, or an annual mortality of 14.64, which is an indication of the continued absence of any serious or epidemic disease within the State.

CONSUMPTION is credited with one hundred and forty-six deaths, or 16½ per cent of the total mortality.

PNEUMONIA.—The total deaths from this disease were fifty-two, a very slight increase over the death record of the preceding month.

BRONCHITIS caused eleven deaths only, which indicates a general abatement of the severity of the disease.

CONGESTION OF THE LUNGS was fatal in ten instances.

DIARRHŒA AND DYSENTERY show their frequency and severity by causing thirty-three deaths in May, against eight deaths in April.

CHOLERA INFANTUM is likewise increasing in frequency, twenty deaths being ascribed to it during the month.

DIPHTHERIA was fatal in twenty-four instances. Of these, only six occurred in San Francisco, seven in Los Angeles, four in Oakland, three in Healdsburg, and one each in Benicia, Downey, Grass Valley, and Gonzales.

CROUP.—Eight deaths are ascribed to this disease—three in San Francisco, two in Santa Barbara, one each in Los Angeles, Oakland, and Benicia.

WHOOPING-COUGH being very prevalent caused eleven deaths, which is nearly double the fatality of the preceding month.

SCARLET FEVER is reported as causing five deaths—one each in Antioch, Chico, Los Angeles, San Francisco, and Oakland.

MEASLES, although prevailing extensively, was fatal in but two instances.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER caused but two deaths.

TYPHOID FEVER is credited with twenty deaths, which is a slight decrease from former report.

REMITTENT AND INTERMITTENT FEVERS caused four deaths.

CEREBRO-SPINAL FEVER is reported as causing twelve deaths. Of these, two occurred in San Francisco, and one each in Sacramento, Sisson, Santa Cruz, San Bernardino, Ione, Mendocino, Anderson, Downey, Oakland, and Hanford.

CANCER caused twenty-five deaths.

ERYSIPELAS was fatal in three instances.

HEART DISEASE caused eighty deaths.

ALCOHOLISM was fatal in two instances.

The towns reporting no deaths were Alturas, Calico, Colfax, Elsinore, Elk Grove, Fort Bidwell, Livermore, Lincoln, Monterey, Needles, Soquel, Truckee, Wheatland, and Williams.

PREVAILING DISEASES.

Reports received from eighty different localities give evidence that the excess of humidity that prevailed during the earlier part of the past month, and the increased temperature during the latter half, had the effect of developing malarial and other fevers in quite a large number of localities that, up to this time, had been completely free from them. The increased moisture and subsequent heat had, no doubt, its influence in causing the general tendency that was evinced to choleraic attacks which prevailed extensively during the month. Inflammatory diseases of the respiratory organs were much reduced in frequency and fatality.

PNEUMONIA, in sporadic form, was noticed in reports from Downey, Redding, Lockeford, Truckee, Calico, Hollister, Shasta, Oakdale, Monterey, Cloverdale, Lakeport, Red Bluff, Downieville, Fresno, Napa, Grass Valley, Chico, Forest Hill, Oakland, Pasadena, Santa Barbara and San Francisco.

BRONCHITIS, in a mild form, is mentioned in reports from Lockeford, Downey, Lemoore, Anderson, Lakeport, Monterey, College City, Elsinore, Oakdale, Ione, Hollister, Igo, Redding, Cottonwood, Williams, Fresno, and San Francisco.

WHOOPING-COUGH has extended its area considerably during the month. It is reported in Lockeford, Knights Ferry, Mariposa, Williams, Lodi, Lemoore, Angels Camp, Oakdale, Elsinore, Hollister, Santa Cruz, Merced, Fresno, Woodland, Oakland, and San Francisco. It has been remarked that the disease seems to progress hand in hand with measles, and is apparently influenced by the temperature, increasing with a falling and diminishing with a rising temperature. As the disease is highly infectious, children suffering from it should not be allowed into schools, or crowded assemblies, or wherever other children are congregated.

MEASLES is quite prevalent in many parts of the State, and spreading rapidly. We notice it mentioned in reports from Lockeford, College City, Downey, Williams, Lodi, Angels Camp, Oakdale, Monterey, Alturas, Etna Mills, Santa Cruz, Fresno, San Francisco, and Oakland. The evidence grows stronger every day that measles, like scarlet fever, is the result of a specific germ, and consequently is preventable. It is, however, so intensely contagious that the difficulty of doing this is proportionately great. The unfortunate results that so often follow measles justifies us in recommending the placing of unprotected persons beyond its influence. The sick should be isolated, and none but

attendants allowed to enter the room. All soiled linen should be soaked in disinfectant solutions and boiled separately. The body of the patient should be anointed daily to restrain the dissemination of the contagion as much as possible. After the desquamation of the skin has taken place, a warm bath should be administered, which will probably remove any remaining contagious principle. Children with measles should not be allowed out of doors or permitted to mingle with healthy children until quite recovered.

SCARLET FEVER, although mentioned in reports from Sacramento, Redding, Calico, Los Angeles, Salinas, San Francisco, Elk Grove, Antioch, Jackson, Fresno, Chico, and Oakland, does not seem to assume an epidemic character or any malignancy. This fact, however, should not lessen the vigilance of the Health Officers to prevent its spread, as some of the most malignant and fatal epidemics have arisen from the mildest cases. In Antioch, where the disease was quite prevalent, Dr. F. Rattan assures us it has ceased. Dr. Rattan has been appointed Health Officer.

DIPHTHERIA AND CROUP were noticed during the month in Downey, Igo, Anderson, Truckee, Los Angeles, Monterey, Salinas, Benicia, Elk Grove, Colfax, Gold Run, Grass Valley, Healdsburg, Oakland, San Francisco, and Santa Barbara. In Gold Run the disease has been particularly severe, twenty-one cases having occurred within the past four months. Dr. Miner writes that the sanitary condition of the place is not good. The reservoirs and ditches are filled with decaying vegetable and organic matter, and the wells, sunk below these ditches, are contaminated by seepage water. There is no local Board of Health, and, consequently, no effort made to improve the sanitary condition of the place or disinfect the contaminated dwellings. Until Boards of Health are organized or efficient Health Officers appointed in every town, we must expect this needless sickness and sacrifice of life to continue.

SMALLPOX.—Three cases of smallpox appeared in San Francisco, one case in Lodi, and one case in Stockton, during the month of May. All are now convalescing, without any new cases being reported.

ERYSIPELAS was noticed in reports from Etna Mills, Hollister, Lincoln, Shasta, Oakdale, Fresno, Truckee, Elk Grove, Lemoore, Anaheim, Grass Valley, Riverside, and San Francisco. These cases were all sporadic, due to local causes.

TYPHOID FEVER is mentioned by very few observers. Sporadic cases appeared in Los Angeles, Etna Mills, Salinas, Santa Cruz, Hollister, Mendocino, Sacramento, Santa Barbara, Selma, Watsonville, and San Francisco.

TYPHO-MALARIAL FEVER was more prevalent than typhoid, being noticed in College City, Oakland, Downey, Cottonwood, Lemoore, Fresno, Igo, Anderson, Ione, Oakdale, Merced, Anaheim, Needles, and other places. The fatality was very limited.

REMITTENT FEVER prevailed to some extent in Hanford, Grass Valley, Marysville, Sacramento, Lockeford, Knights Ferry, Cottonwood, Redding, Lemoore, Anderson, Angels Camp, Ione, Cloverdale, and Needles.

CEREBRAL FEVER was observed in a sporadic form in Fresno, Jolon, Downey, Anderson, Ione, Hanford, Mendocino, Oakland, Sacramento, San Bernardino, San Francisco, Santa Cruz, and Sisson.

CHOLERA INFANTUM is mentioned in our reports from Knights Ferry, Ione, Gridley, Merced, Fresno, Anderson, Anaheim, Chico, Grass Valley, Nevada City, Red Bluff, San Francisco, Oakland, and San Bernardino.

DIARRHŒA AND DYSENTERY are quite prevalent in Sacramento, San Francisco, Oakland, Downey, Mariposa, Williams, Lodi, Redding, Oakdale, Lockeford, College City, Anderson, Lemoore, Monterey, Los Angeles, Angels Camp, Cloverdale, Salinas, Shasta, Placerville, Hollister, Fresno, Gridley, Truckee, Red Bluff, Soquel, Needles, Riverside, San Diego, Selma, Hanford, Dixon, and San Francisco.

DYSENTERY was reported as epidemic in Fresno, but inquiry of the Health Officer, Dr. T. M. Hayden, elicits the fact that such was not the case. Some sporadic cases were observed as prevailing, but nothing more. In Hanford it was also reported as epidemic, but careful inquiry through Dr. John A. Davidson, Health Officer, resulted in ascertaining that among children a very severe form of miasmatic colitis prevailed, complicated in many cases by cerebral congestion, which was generally fatal. Through the kindness of Dr. W. H. Miller, of Hanford, this Board has received a very graphic description of the disease, together with the results of a post mortem examination, which indicated a very severe form of inflammatory disorder of the bowels, extending, in the case narrated, to the brain. This severe and fatal form of attack seems confined to children, no deaths among adults being observed. The opinion is daily gaining credence that the excretions in dysenteric attacks should be immediately disinfected and buried, as it is generally believed that the disease depends upon a living germ taken into the stomach, either with the food or through the impurity of the water imbibed. Indeed, so many diseases can be produced from impure water, that for prudential reasons, all water should be boiled before being used for drinking purposes, especially during the summer months.

PACIFIC COAST WEATHER.

WEATHER.—The first half of the month was marked by cool weather and frequent rains. During the latter half of the month the temperature was high and the weather fair, except in Oregon and Washington Territory, where light rains occurred at intervals. The heavy rains of the first part of the month were, on the whole, beneficial to growing crops, though causing damage in some localities.

RAINFALL.—The rainfall during the month was in excess of the normal rainfall for May in all districts, markedly so, except in the vicinity of Puget Sound and in the San Joaquin

Valley, where the departures from the normal were small. The rainfall for the season to June first is decidedly below the normal in Oregon, Washington Territory, and Nevada, and slightly below it in the San Joaquin Valley. In other districts the seasonal rainfall is slightly in excess of the normal.

JUNE, 1889.

Reports received from eighty towns, with an estimated population of seven hundred and twenty-eight thousand seven hundred, give a total mortality of eight hundred and fifty-four, which is a percentage of 1.17 per thousand in the month, or an annual mortality of 14.04, which is an exceptionally small death rate, and indicates how little serious sickness was present within the State during the month of June.

CONSUMPTION is credited with one hundred and thirty-nine deaths, which is less than the usual monthly mortality.

PNEUMONIA.—The number of decedents from this disease decreased to thirty-five, or 20 per cent from the previous month.

BRONCHITIS caused eighteen deaths, which is a slight increase.

CONGESTION OF THE LUNGS is credited with sixteen deaths, the greater number occurring in young children.

DIARRHŒA AND DYSENTERY were the cause of twenty-three deaths, which, while a decrease from last report, indicates a great frequency of these diseases.

CHOLERA INFANTUM was fatal in twenty-two instances, which also shows increasing frequency of the disease.

DIPHTHERIA was fatal in twenty-six instances. Of these, San Francisco had only four, Los Angeles eight, Oakland six, and one each in Santa Cruz, Santa Monica, Santa Ana, San Bernardino, Petaluma, Modesto, Colton, and Calico.

GROUP was fatal in six instances—three in San Francisco, two in Los Angeles, and one in Oakland.

WHOPING-COUGH, although quite prevalent, and in some places epidemic, only records three deaths as a result of the disease, which indicates an unusual mildness of its type.

SCARLET FEVER caused five deaths—one in San Francisco, one in Selma, one in Tulare City, and two in Riverside.

MEASLES was fatal in but two instances—one in San Francisco and one in Williams.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER, although reported as prevailing, caused one death in San Francisco.

TYPHOID FEVER is credited with thirty-one deaths, which is an increase of ten over last report. Nine of these deaths occurred in San Francisco, six in Los Angeles, three in San Diego, two in Santa Monica, two in Riverside, two in Sacramento, and one each in Wheatland, Selma, Mendocino, St. Helena, Calico, Etna Mills, and Alameda.

REMITTENT AND INTERMITTENT FEVERS caused one death in Marysville.

CEREERO-SPINAL FEVER is credited with causing six deaths—three of these in San Francisco, and one each in Sacramento, Anderson, and Anaheim.

ERYSIPELAS was fatal in four instances.

CANCER caused forty-two deaths, which is an increase of seventeen over last report.

HEART DISEASE is credited with fifty-one deaths.

ALCOHOLISM was fatal in six instances.

THERMIC FEVER, or Heat Apoplexy, is credited with causing two deaths in Stockton. The particulars of these cases were not received. No other death from this cause is reported within the State.

PREVAILING DISEASES.

Reports of sickness received from ninety-four localities throughout the State indicate that a minimum amount of disease prevailed during the month of June. Although the reports of the Signal Service declare that the mean temperature of the month was above the average, its effects were not manifested by any great increase in the number of cases of bowel disorders reported. It is, however, very doubtful if an increase of temperature has, of itself, that marked effect upon intestinal derangements that is so popularly ascribed to it. The state of the weather in its relation to health is, in a great measure, governed by the local conditions surrounding us. If they are bad, and need only an increase of heat to develop those poisonous emanations which are hidden under a lower temperature in all decaying and decomposing animal and vegetable matter, then will sickness increase, bowel disorders flourish, and the warm weather be unjustly blamed for what our own foresight should have prevented. If, before the warm days and nights come upon us, we would see that our cities, towns, villages, and dwellings were properly cleaned and divested of all possible sources of corruption—that our drinking water was pure and our air untainted by human filth, then even extremes of temperature would have very little effect in engendering disease or shortening our lives.

CHOLERA INFANTUM.—We find this disease was noticed in Redding, Biggs, Knights Ferry, Lodi, Ione, Anderson, Antioch, Grass Valley, Fresno, Pomona, Woodland, Sacramento, San Diego, San Bernardino, and San Francisco. The disease was in a sporadic form, and could be traced in most instances to errors in diet. In one case, in which death occurred in less than fifteen hours, it was undoubtedly due to tyrotoxicon developed in milk while standing in an unsanitary cellar for six hours. We have no doubt that many infantile deaths are caused in this way, which are wholly preventable by care and the exercise of common sense.

DIARRHOEA AND DYSENTERY were reported as quite prevalent in a large number of localities. They were noticed in Sacramento, Brownsville, Williams, Truckee, Biggs, Angels Camp, Redding, Anderson, Lakeport, College City, Lemoore, Knights Ferry, Lodi, Colton, Ione, Selma, Traver, Needles, Calico, Chico, Hollister, Los Angeles, Oakdale, Santa Barbara, San Diego, Truckee, Tulare City, Etna Mills, Forest Hill, Red Bluff, Colfax, Shasta, El Monte, Downey, and Fresno.

SMALLPOX was not reported from any town in the State. *Varicella*, or chickenpox, was noticed in Los Angeles, Mariposa, Sacramento, and a few other towns, in sporadic form. Dr. A. C. Keating, in San Bernardino, reports smallpox as raging in Albuquerque, New Mexico. This is getting the disease quite close to our southern border, and will probably need an Inspector on the line, if the report is confirmed.

MEASLES, of an exceedingly mild type, was noticed in Santa Cruz, Williams, Traver, Angels Camp, Lodi, Hollister, San Francisco, College City, Downey, Etna Mills, and Red Bluff.

SCARLET FEVER was noticed in a few instances in San Francisco, Selma, Pomona, Riverside, Ione, Calico, Los Angeles, Tulare City, Anderson, and Oakland. The type of the disease continues to be mild, and its tendency to spread very limited.

DIPHTHERIA AND CROUP continue to be mentioned in our reports; last month they were noticed in San Francisco, Los Angeles, Oakland, Santa Cruz, Truckee, Williams, Soledad, Colton, Igo, San Bernardino, Modesto, Petaluma, Santa Monica, Santa Ana, and Calico. The prevention of the spread of these diseases is an object which should engage the attention of Health Boards and Health Officers throughout the State. Without the greatest vigilance on their part the disease will continue to enlarge our mortality lists, and cast reflection upon our sanitary progress. Nurses and physicians attending diphtheritic patients should avoid, as far as possible, the infection of their persons and clothing—several cases having been recorded of the conveyance of the poison by those parties, they themselves remaining well. Where diphtheria is prevalent parents should daily inspect the throats of their children before sending them to school, and if any sign of inflammation appears they should be kept at home, as it is these cases of so called "walking diphtheria" or mild diphtheria, that are the most common sources of propagating the disease, being allowed to mingle with other children, drink from the same cup, play with the same toys, and even kiss each other, without fear of consequences. No parent is justified in sending the children to school when the infectious disease is present in their house, no matter what its character.

WHOOPING-COUGH was epidemic at Hollister, and quite prevalent at Dixon, Lemoore, Knights Ferry, Elsinore, Mariposa, Angels Camp, Oakland, Selma, Lodi, Los Angeles, Forest Hill, and Napa. The discovery by Professor Afanassjew that whooping-cough depended upon a specific bacillus, has brought the disease within the category of those that are preventable, or, at all events, of those that are amenable to a measure to specific treatment; hence, the relief experienced by those children exposed to the sulphurous fumes about gasworks, and the treatment by certain antiseptic drugs. In the near future, we hope science will give us complete control of this, one of the most fatal diseases of infancy.

ERYSIPELAS, in sporadic form, was observed in Antioch, Dixon, Lemoore, Brownsville, Pomona, Angels Camp, Needles, Ione City, Fresno, San Bernardino, Forest Hill, Oakland, and San Francisco.

TYPHOID FEVER prevailed to some extent in Los Angeles, San Francisco, Oakland, Alameda, Sacramento, Etna Mills, Calico, College City, Colfax, Dixon, Selma, Wheatland, Santa Monica, San Diego, Riverside, Mendocino, and Fresno.

TYPHO-MALARIAL FEVER is also noted in reports from Redding, Anderson, Anaheim, Oakdale, Williams, San Bernardino, Igo, Ione, College City, Red Bluff, and Colton.

REMITTENT AND INTERMITTENT FEVERS are mentioned in many reports as prevailing. These being essentially malarial fevers, and dependent in a great measure upon local conditions, are to be expected at this season of the year, when ponds and marshy grounds are drying up and rivers falling.

THERMIC FEVER.—Some instances of heat exhaustion have been observed during some of the warm days in the month, but no report of its prevalence has been received at this office.

PACIFIC COAST WEATHER.

But one well marked storm appeared upon the Pacific Coast in June. This was central in Washington Territory on the twenty-seventh and twenty-eighth, the accompanying rain area extending as far south as San Francisco. This storm was accompanied by high winds off the coast of Oregon and Washington Territory.

Rain fell in Oregon and Washington Territory on the 26th, 27th, 28th, and 29th, and in Northern California on the 27th. Light showers occurred in portions of Southern California on the 4th.

THE MEAN TEMPERATURE for the month was decidedly higher than usual, except along the coast of California, where the departures from the normal were small.

THE RAINFALL for the month was below the normal rainfall for June, except in Washington Territory and portions of Northern California, where it was about normal.

JULY, 1889.

Reports of mortality received from one hundred cities and towns, with an estimated population of eight hundred and three thousand five hundred and fifty, give the number of deaths as eight hundred and ninety-seven, which is a percentage of 1.11 per thousand in the month, or an annual mortality of 13.32, which is the smallest death rate yet recorded in the year. It indicates an entire absence of epidemic disease of a fatal character, and a general condition of healthfulness throughout the State, which speaks louder than words.

CONSUMPTION, which enters so largely into our mortality returns, was fatal in one hundred and twenty-nine cases, which is below the monthly average.

PNEUMONIA had a mortality of thirty-eight, of which number twenty-three occurred in San Francisco, the others in different parts of the State.

BRONCHITIS is reported to have caused nine deaths, seven of which occurred in San Francisco, one in Chico, and one in San Diego.

CONGESTION OF THE LUNGS was also fatal in nine instances.

WHOOPIING-COUGH, which prevails in a great many places, caused eleven deaths, which is an increase in mortality from this disease.

CROUP was fatal in three cases, all of them occurring in Los Angeles.

DIPHTHERIA is credited with fifteen deaths, which is a decrease of eleven from last month's mortality; of these deaths only six occurred in San Francisco; four were reported from Los Angeles, and one each from El Monte, Grass Valley, Red Bluff, Healdsburg, and San José.

DIARRHŒA AND DYSENTERY were the cause of sixteen deaths, which is a decided decrease from the June report.

CHOLERA INFANTUM was fatal in twenty-three instances, which shows an increasing frequency in that disease.

SCARLET FEVER is reported as causing but one death during the month; that was in San Francisco.

MEASLES caused no deaths.

SMALLPOX.—No deaths from it were reported.

TYPHO-MALARIAL FEVER is credited with four deaths.

TYPHOID FEVER is reported to have been the cause of twenty-nine deaths, which is a slight decrease from last report. Thirteen of these deaths occurred in San Francisco, two each in Sisson, Santa Ana, Sacramento, and Placerville, and one each in Dixon, El Monte, Los Angeles, Mendocino, Nevada City, Pasadena, San Diego, and Watsonville.

REMITTENT AND INTERMITTENT FEVERS are credited with six deaths, which is above the usual mortality, and indicates a wide extension of these diseases.

CEREBRO-SPINAL FEVER seems to have caused thirteen deaths, which is a large increase over the report for June. Three of these occurred in San Francisco, two in San José, two in Lodi, and one each in Sacramento, Susanville, Eureka, Napa, Angels Camp, and Anderson.

ERYSIPELAS was fatal in but two instances.

CANCER caused twenty-one deaths.

HEART DISEASE was fatal in eighty-four instances during the month of July, which is a large increase from this cause.

ALCOHOLISM was the cause of death in nineteen cases, which is also a very large increase over the usual number that die from this preventable disease.

PREVAILING DISEASES.

Reports received from one hundred and twenty localities throughout the State indicate a remarkable absence of zymotic diseases. All observers agree that a general mildness of type characterized the sickness which had come under their notice, which will, perhaps, in a measure, account for the limited mortality recorded during the month. As might be expected, the most prevalent of all disorders of the system were those affecting the stomach and bowels, and this was particularly noticed during and after the very warm days that were experienced in the earlier and latter part of the month.

CHOLERA INFANTUM was noticed in several reports. It was present in Sacramento, Cedarville, College City, Mariposa, Lodi, Forest Hill, Fresno, Salinas, Chico, Grass Valley, Lakeport, Lemoore, Oakland, Rocklin, San Bernardino, San José, and San Francisco.

DIARRHŒA AND DYSENTERY were observed with undue frequency in Alturas, Fresno, Hollister, Williams, North Bloomfield, Shasta, Red Bluff, Anderson, Redding, Brownsville, Eureka, Lemoore, Merced, Colfax, College City, Benicia, Susanville, Lakeport, El Monte, Santa Paula, Etna Mills, Calico, Downey, Oakdale, Truckee, Los Angeles, Marysville, Oakland, and San Francisco.

SMALLPOX was not reported from any locality during the month. We have therefore come to the reasonable conclusion that the disease is now entirely absent from the State for the first time in over two years. This fact should now be taken advantage of by urging immediate vaccination of all unvaccinated persons, so that if the disease is again imported into the State it will find no pabulum upon which to feed, and will die for want of sustenance. By thorough vaccination there need not be another case of smallpox in California; it is to be hoped that the new law upon vaccination will tend toward this desirable end, and by protecting our children, lessen the chances of any severe epidemic, even if again attacked by the insidious foe.

MEASLES was observed in a few instances, in San José, Lodi, and Angels Camp. It was very mild, and without any mortality.

SCARLET FEVER is mentioned in but two reports, and they were sporadic cases.

DIPHTHERIA AND CROUP are mentioned in reports from Sacramento, Napa (imported from Howell Mountain), Anaheim, El Monte, Downey, Los Angeles, San José, Red Bluff, Truckee, Eureka, Fresno, Salinas, and San Francisco. The disease is not reported epidemic in any locality, and the type is not of a severe character, according to the advices received.

WHOPING-COUGH was noticed in Napa, Lemoore, Mariposa, Redding, Elsinore, Susanville, San José, Dixon, Eureka, Fresno, Chico, Hollister, Los Angeles, Oakland, and San Francisco.

ERYSIPELAS in a sporadic form was observed in Truckee, Redding, North Bloomfield, Lower Lake, Long Beach, Fresno, Cedarville, Dixon, Chico, and San Francisco.

TYPHO-MALARIAL FEVER, as it is called, seems to prevail in many localities; it is noticed in reports from Anderson, Igo, Lemoore, College City, Oakdale, Anaheim, Truckee, Shasta, Los Angeles, Tulare City, and Visalia. Although the disease is frequent, the mortality is exceedingly limited.

TYPHOID FEVER, while not prevailing to any great extent, was noticed in reports from Sacramento, Redding, Anderson, Etna Mills, North Bloomfield, Chico, El Monte, Calico, Downey, San José, Alturas, Fresno, San Diego, Placerville, Los Angeles, Mendocino, Nevada City, Santa Ana, Pasadena, Sisson, Watsonville, and San Francisco. As this is the season of the year when typhoid fever is most likely to prevail, and thereby increase the chances of the contamination of our drinking water, and as it is also at this time that visitors leave the warm valleys to seek health and recreation at the various mountain and seaside resorts, we cannot too earnestly advise such sojourners to criticise keenly the sanitary surroundings of the place in which they propose to spend their summer holiday; examine the outhouses and privies; see where the sewage is conveyed and deposited; note the proximity of the closets to the well, and if the well is a dug one, and within three hundred feet of the sewer, cesspool, or privy, do not drink the water from such well, except you know it to be boiled. In short, avoid all summer resorts where cleanliness and sanitation is not the rule, where every outhouse, privy, and cesspool is not deodorized and disinfected as regularly as the week comes round. Without this, danger is ever present, and we firmly believe that more typhoid fever is contracted in these insalubrious country houses, whose portals we seek for health, than the public is aware of. The frequent proximity of cow yards, hen roosts, stables, and even pig pens, make the surrounding atmosphere anything but salubrious. It is therefore an act of prudence to study the sanitary surroundings of a pleasure resort before incurring the exposure, and perhaps fatal danger, which sanitary conditions always present.

REMITTENT AND INTERMITTENT FEVERS were quite prevalent along the river bottoms, which is to be expected at this season of the year.

PNEUMONIA is not mentioned as frequent in any of our reports. Some cases were noticed in San Francisco, Eureka, Benicia, Anderson, Angels Camp, College City, Chico, Jackson, Los Angeles, Mariposa, Oakland, Salinas, San José, Santa Ana, and Trinity.

BRONCHITIS was also noticed in several towns along the seacoast. The type was not of a severe character, and its prevalence was limited.

CEREBRAL FEVER is mentioned in reports from Anderson, Angels Camp, College City, Fresno, Lodi, Eureka, Napa, Sacramento, San José, Susanville, and San Francisco. The appearance of cerebral fever in different sections of the State would seem to confirm the opinion of late observers that the infectious germ is preserved in the soil, and thence passed into the atmosphere, as it is now known that epidemics of this disease may appear at any season independent of local temperature; and as drying does not destroy the vitality of the disease germ, it may explain those cases of the disease which seem to spread by way of the air.

PACIFIC COAST WEATHER.

In Oregon and Washington Territory the mean temperature for the month was decidedly above the average for July. In California the temperature was lower than usual during the greater part of the month, though very warm weather during the first few and last few days brought the mean temperature for the month slightly above the normal.

Local showers fell in portions of Oregon and Washington Territory on the sixteenth, seventeenth, and twenty-third.

AUGUST, 1889.

Mortality reports received from one hundred localities throughout the State, with an estimated population of eight hundred and thirty thousand four hundred and fifteen, give the number of deaths as eight hundred and nine, which is a percentage of 0.97 per thousand in the month, or an annual mortality of 11.64, which we believe to be the lowest death rate ever recorded in this State. It indicates a degree of healthfulness throughout California which is most gratifying to the sanitarian, and gives evidence that the health organizations lately instituted under the new law are doing efficient work.

CONSUMPTION added largely to our mortality returns by one hundred and thirty-nine deaths.

PNEUMONIA had a mortality of thirty-nine. Twenty-four deaths occurred in San Francisco, four in Oakland, two in Los Angeles, two in Sacramento, and one each in Angels Camp, Chico, Eureka, Martinez, Nevada City, Petaluma, and Redding.

BRONCHITIS caused but nine deaths, seven of them in San Francisco, one in Grass Valley, and one in Los Angeles.

CONGESTION OF THE LUNGS was fatal in four instances.

WHOOPING-COUGH is credited with ten deaths.

DIPHTHERIA AND CROUP, which may be classed together, are reported as causing twenty-six deaths; of these, five are attributed to croup. Only four deaths from diphtheria occurred in San Francisco, six in Los Angeles, three in Oakland, two in Sacramento, two in Downey, and one each in Elk Grove, Livermore, Mendocino, and Willows.

DIARRHŒA AND DYSENTERY, although quite prevalent in many localities, caused but six deaths.

CHOLERA INFANTUM likewise reports the small mortality of eleven, which is a decrease of one half from last report.

SCARLET FEVER caused one death in San Francisco, and one in Livermore.

MEASLES was fatal in one instance, in San Francisco.

TYPHO-MALARIAL FEVER is credited with one death.

TYPHOID FEVER is reported to have caused twenty-two deaths, which is remarkably small at this season of the year.

REMITTENT AND INTERMITTENT FEVERS are credited with five deaths.

CEREBRO-SPINAL FEVER caused six deaths—one each in Fort Bidwell, Mendocino, and San José, and three in Oakland. The decrease in the mortality from this disease is very gratifying.

ERYSIPELAS was fatal in but two instances.

CANCER caused seventeen deaths.

HEART DISEASE was fatal in sixty-four cases.

ALCOHOLISM was the cause of death to seven persons, which is a decrease from last report.

The following towns report no deaths during the month: Anderson, Colton, Colusa, Dixon, Downieville, Elsinore, Galt, Gonzales, Knights Ferry, Lemoore, Lincoln, Roseville, San Mateo, and Trinity. In San Bernardino there was but one death, and that from accident.

PREVAILING DISEASES.

Reports received from one hundred and twenty localities continue to indicate that in the month of August the minimum of sickness which prevailed during July still continued. No epidemic is reported anywhere, and when we consider that this office has now established communication with almost every portion of the State, and therefore in a position to ascertain the facts, this phenomenal absence of any prevailing disease within its borders is remarkable. A report was received that smallpox was raging in Socorro, in New Mexico, but upon investigation through our efficient Health Officer, Dr. J. P. Booth, at Needles, we learned that although the disease was there, as reported, it was under control, and did not seriously menace our State. Dr. Booth may be trusted to guard against its inroad within his jurisdiction.

Although the meteorological conditions were, from an increased temperature above the normal, most favorable to the development of intestinal derangements, we find that in fact, that most frequent of all accompaniments to abnormal heat among children—

CHOLERA INFANTUM was seldom mentioned in our reports. Some sporadic cases were noticed in Sacramento, Lodi, Ione, Anderson, Downey, Lemoore, San José, Madera, Fresno, Anaheim, Chico, Grass Valley, Oakland, Redlands, and San Francisco. They were few in number, and the mortality, as may be seen, was very limited.

DIARRHŒA AND DYSENTERY were noticed with some frequency, but without epidemicity, in Soquel, Napa, Ione, Angels Camp, Anaheim, Williams, Anderson, Sausalito, El Monte, Monrovia, Shasta, Etna Mills, Chico, Lodi, Downey, Truckee, Lemoore, Susanville, Millville, North Bloomfield, Fresno, Healdsburg, Grass Valley, Nevada City, and Marysville.

SMALLPOX is not mentioned in a single report. It therefore continues to remain absent from the State.

MEASLES was noticed in a few instances in Sausalito, Dixon, Merced, and San Francisco.

SCARLET FEVER made its appearance in a limited number of cases, in Sacramento, Elk Grove, Sausalito, Livermore, Alameda, and San Francisco.

DIPHTHERIA AND CROUP, as we must class them together, were observed in Sacramento, Anderson, El Monte, Monrovia, Downey, Truckee, San José, Chico, Anaheim, Los Angeles, Livermore, Mendocino, Willows, Oakland, and San Francisco.

The instrumentality of Boards of Health in educating the public to the dangerous and contagious nature of this disease, and the necessity of strict isolation and complete disinfection of all persons and things in contact with it, has done much to limit its spread, and to their efficient action may we hope soon to be enabled to chronicle the event of its complete disappearance from our midst, as it is a disease as surely susceptible of perfect extirpation as smallpox, if as efficiently dealt with. To do this promptly there should be a law to compel a notification of its presence in every instance to the Health Officer, and the premises quarantined by a distinctive flag or printed notice. If we reflect that diphtheria is more deadly than smallpox, and more destructive in its ultimate results, it will be conceded that no measures can be too strong in guarding the public against its inroads.

ERYSIPELAS was observed in a sporadic form in San Bernardino, Sierra City, Monrovia, Williams, Chico, Truckee, Fresno, and Watsonville.

TYPHOID FEVER.—If Pettenkofer's theory be true, that the prevalence of typhoid fever is dependent in a great measure upon the height of the ground water, we ought, owing to the dryness of the season, to have had frequent mention of it in our reports; whereas,

in fact, it seems to prevail to quite a limited extent. Sporadic cases were observed in Angels Camp, Sacramento, Napa, Sierra City, Needles, Monrovia, Redlands, Newman, Downieville, Fort Bidwell, Etna Mills, Chico, Downey, Dixon, Elk Grove, San José, North Bloomfield, Rio Vista, Fresno, Placerville, San Diego, Sisson, Susanville, Watsonville, and San Francisco.

TYPHO-MALARIAL FEVER was noticed in Benicia, Ione, Anaheim, Anderson, Redding, Chico, Truckee, Fresno, Igo, Lemoore, and Merced.

REMITTENT FEVER was observed with some frequency in Ione, Angels Camp, Sacramento, Sierra City, Anderson, Redding, Fort Bidwell, Chico, Truckee, Igo, Lodi, Santa Cruz, Fresno, Millville, Folsom, Newcastle, Ophir, Loomis, and Selma.

PNEUMONIA is seldom mentioned in any of the reports. A few cases occurred in Benicia, Ione, Anderson, Downieville, Redding, Truckee, Petaluma, and Fresno. It was quite prevalent in San Francisco during the month in a sporadic form, and dependent upon local causes.

BRONCHITIS, in a mild form, was reported in San Bernardino, Williams, Needles, El Monte, Eureka, Chico, Lockeferd, Fresno, and San Francisco.

WHOOPING-COUGH is mentioned in reports from Napa, Sausalito, Monrovia, Eureka, Newman, Chico, Downey, Sacramento, Dixon, Lodi, Susanville, Santa Cruz, Millville, Lockeferd, Fresno, Los Angeles, Hollister, and San Francisco.

THERMIC FEVER.—Three cases were reported as occurring in Needles, but happily without fatal results.

As the organization of local Boards of Health and the appointment of Health Officers are now being rapidly accomplished in obedience to the State law making such appointments compulsory, we would beg to remind all communities so favored that such organizations or appointments can offer no means of defense against the inroads of disease without the active coöperation of the citizens among whom they are placed. We know that the prosperity of a town depends much upon its healthfulness and the safety of life therein; it therefore becomes most important that upon the first appearance of any infectious disease its presence should be made known to the officers of health, that all necessary precautions may be taken to prevent in the first instance its spread; secondly, to discover, if possible, its cause; and, thirdly, to take measures to remove or destroy it. Typhoid fever, smallpox, scarlet fever, and kindred infectious diseases, need never extend beyond their original point of development if properly cared for under the instructions of an intelligent Health Officer. It, therefore, becomes the highest duty of a citizen to coöperate with the officers of health to save not only the community from sickness and their fellow citizens from death, but also to preserve the good name of their town for healthfulness and sanitary salubrity. "There is no doubt," says a late writer, "that the people themselves are responsible for many of the diseases which afflict them, and when the art of preserving health shall have attained to the same perfection as the means that now exist for destroying it, we may expect a large reduction in sickness and a willingness to be governed by sanitary rules that are now looked upon by a large class of people as interfering with their personal liberty."

PACIFIC COAST WEATHER.

The mean temperature for the month was slightly higher than the normal temperature for August, in all of the Pacific Coast districts, the first half of the month being marked by temperature decidedly above the normal.

Rain fell in Oregon and Washington Territory on the 17th, 18th, 23d, 26th, 27th, 30th, and 31st; at San Diego on the 16th, and in the vicinity of Los Angeles on the 31st.

SEPTEMBER, 1889.

Reports received from one hundred and six localities throughout the State, with an estimated population of seven hundred and ninety-nine thousand five hundred, give the number of deaths as eight hundred and seventy-six, which is a percentage of 1.9 per thousand in the month, or an annual mortality of 13.08, which, while a very low percentage, is much higher than that recorded in August.

CONSUMPTION is credited with one hundred and twenty-one deaths, which is a decrease from last month.

PNEUMONIA caused forty-nine deaths, which is an increase of ten over last report.

BRONCHITIS was fatal in fourteen instances, thirteen of which occurred in San Francisco.

CONGESTION OF THE LUNGS caused eight deaths.

WHOOPING-COUGH was fatal in but one instance, although the disease was quite prevalent.

DIPHTHERIA AND CROUP, which may be classed together, caused thirty-one deaths, twelve of which were attributed to croup.

DIARRHŒA AND DYSENTERY show an increase in mortality, twenty deaths being ascribed to these causes.

CHOLERA INFANTUM also shows a marked increase in its death rate, twenty-five deaths being attributed to it.

SCARLET FEVER was fatal in but three instances.

MEASLES caused no deaths.

TYPHO-MALARIAL FEVER is credited with five deaths.

TYPHOID FEVER shows a slightly increased death rate, twenty-seven deaths being recorded as arising from this cause.

REMITTENT AND INTERMITTENT FEVERS have attributed to them six deaths.

CEREBRO-SPINAL FEVER caused eight deaths.

ERYSIPELAS was fatal in but two instances.

CANCER is credited with thirty-seven deaths during September, which is just double the number recorded the previous month from this disease.

ALCOHOLISM caused the death of seven persons.

The following towns report no deaths in September: Brownsville, College City, Dixon, El Monte, Gonzales, Igo, Knights Ferry, Lockeford, Lower Lake, Lodi, Martinez, Monrovia, Modesto, Needles, Oakdale, Orland, Ontario, Sierra City, Santa Maria, Santa Paula, Trinity County, Visalia, and Williams.

PREVAILING DISEASES.

Reports received from one hundred and twenty-eight localities throughout the State continue to indicate an exceptionally favorable condition of the public health, many of our correspondents reporting no sickness whatever in their localities. Dr. H. L. Nichols, the efficient Health Officer of Sacramento, remarks "that the death rate for September in Sacramento was lower than for many years, and if we exclude the accidental and violent deaths, it is wonderfully low. There were but two deaths from zymotic causes, as against nine in September, 1888." Among the reports of Health Officers in other parts of the State we find many expressing surprise at the immunity from sickness, which, as a rule, is generally prevalent at this season of the year. A great deal of it may be ascribed to their diligence in having their towns made clean, and no breeding places for disease allowed to exist without abatement.

Although the temperature during September was high, it was not accompanied by any marked increase in intestinal disorders.

CHOLERA INFANTUM was noticed in some of our reports as present in a few instances. Its frequency is diminishing, and will, we hope, very soon be omitted entirely from our list of prevailing diseases.

DIARRHŒA AND DYSENTERY continue to be the most frequently observed disorders during the month. They were noticed as present in Williams, Angels Camp, Merced, Antioch, Susanville, Biggs, Chico, Brownsville, Lemoore, Sausalito, Alturas, Redding, Santa Paula, Needles, El Monte, Knights Ferry, Oakdale, Anaheim, Lodi, Shasta, Fresno, San Pedro, Calico, Salinas, Denman, Selma, Truckee, and Los Angeles.

SMALLPOX is absent from the State.

MEASLES is reported in Antioch and Dixon.

SCARLET FEVER.—A few cases of this disease were observed in Sacramento, Gonzales, Redlands, Antioch, San José, Salinas, Livermore, and San Francisco. The type is very mild.

DIPHTHERIA AND CROUP have been noticed in sporadic form in Sacramento, San José, San Francisco, Downey, El Monte, Fresno, Calico, Salinas, Grass Valley, Los Angeles, Santa Rosa, Orangevale, and Healdsburg.

ERYSIPELAS, also in sporadic form, was reported in Monrovia, Susanville, Brownsville, Chico, Cottonwood, Truckee, Downey, Needles, Fresno, Calico, and Anaheim.

TYPHOID FEVER is noticed with increasing frequency in our reports, as might be expected from the extreme lowness of the water in the watercourses. This increasing prevalence of typhoid fever should put us upon our guard relative to the water we drink, and especially to the sources from which it is derived, as it is acknowledged by all those physicians who have carefully investigated the sources from which the disease is communicated, that in ninety-nine cases out of a hundred the chief distributor of the infection is water. It can, however, be communicated by air, the clothing of the sick, and by the hands of the attendants, if precautions are not taken to observe the utmost cleanliness. The possibility of infection by drinking water should render it the care of a paternal government to supply the people with a pure water free from pollution of any kind. At present an attempt is being made to turn the sewage of some large towns into one of the chief rivers of the State. If this is permitted, the result cannot be otherwise than an increase of sickness wherever this river water is used for domestic purposes. The excreta of one typhoid fever patient poisoned the whole water supply of a town in Pennsylvania, caused the sickness of over eleven hundred persons, and the death of four hundred and fourteen. If the diffusion of the excreta of one person carried into river water used for domestic consumption was followed by such dire consequences and fatal results, what may we expect when the sewage of many towns is conveyed into our rivers to pollute their waters and poison the consumers. That the purity of our drinking water has a marked influence in lessening the prevalence of typhoid fever may be instanced by the city of Vienna. In 1864 to 1874 that city was supplied by well water, and water pumped from the river Danube. The deaths annually from typhoid fever in these years averaged three hundred and forty in each one hundred thousand people. In 1874, a supply of spring water was introduced, and the deaths immediately fell off to fifty in one hundred thousand. As the well and river water continued to be abandoned and the supply of water entirely obtained from the springs, the deaths from typhoid fever have fallen to eleven in each one hundred thousand. Can we ask anything more convincing than these statistics to impress us with the necessity that exists of preserving the purity of our water supplies, and keeping them free from sewage contamination? The question of how we are to dispose of our sewage is one that must engage the attention of our legislators before very long. Self-preser-

vation will compel attention to it, as daily our soil is becoming more and more saturated with excremental matters, and it is only a question of a very short time when the ground air will be charged with virulent poisons, and the ground water surcharged with living messengers of death, so that we will be forced into the preservation of our water supplies from contamination, if we desire to preserve our health and our lives.

TYPHO-MALARIAL FEVER is mentioned as occurring in Livermore, Chico, Cottonwood, Truckee, Igo, Knights Ferry, Oroville, and Sacramento.

PNEUMONIA was rather more prevalent during the past month than in August. In Truckee it was of severe type. It is also mentioned in reports from Chico, Sausalito, Sacramento, Oakdale, Fresno, Salinas, Los Angeles, Oakland, Wheatland, San Diego, and San Francisco.

BRONCHITIS was observed quite frequently in San Mateo, Chico, Livermore, Alturas, Lincoln, Santa Cruz, Fresno, Salinas, San Pedro, Lockeford, and San Francisco.

INFLUENZA is noticed as prevailing in many parts of the State, especially on the coast. The type is not severe.

CONSUMPTION.—We have noticed with some apprehension the frequency with which consumption is mentioned in our reports, which might convey an erroneous impression that the disease was increasing in the State among the rising generation. That this, in a limited sense, is true, cannot be denied, but is capable of satisfactory explanation when we take into consideration the fact that for some time past California has been extensively advertised in the Northern and Eastern States as the sanitarium of the world; its luscious fruits and semi-tropical verdure have been exhibited, and its "glorious climate" so dilated upon, that a perfect exodus of diseased humanity has been precipitated upon us. Thus we find sufferers from tuberculosis in all its stages lounging in our hotel corridors, crowding our health resorts, filling our churches and assemblies, and scattering the seeds of death with every mouthful of saliva they expectorate so promiscuously whenever they are gathered together. To this influx of immigrants with diseased lungs may we attribute the apparent increase of consumption in this State. The expositions upon our "glorious climate" throughout the East, has sent us an undesirable element in the population of any country. There is no longer any doubt of the contagiousness of consumption, or of the fallacy that cure resides in climate. The climate of many parts of California will no doubt prolong the life of many consumptives, and, perhaps, arrest the disease in a few, but until we can afford to build sanitariums for the isolation of this class of patients, or erect hotels and devise pleasure resorts for their exclusive use, our State is better off without these immigrants. They disseminate a disease which practically might be unknown under proper sanitary laws, increase our mortality returns, and lessen that high standard of health to which the State is capable of attaining, from its unsurpassed climate, its geological formation, and its possibilities of presenting a temperature suitable to the climatic wants of any constitution, or which the system may demand for the better preservation of its perfect health.

PACIFIC COAST WEATHER.

The month has been marked by high temperatures and light rainfall in all Pacific Coast districts. With the exception of light rains in the southern portion, and on the extreme northern coast, there has been an entire absence of rainfall in California.

In Oregon and Washington the usual September rains occurred, but the monthly rainfall was less than usual.

OCTOBER, 1899.

Reports received from one hundred and one localities, with an estimated population of eight hundred and forty-six thousand three hundred, give the number of deaths as one thousand and seven, which is a percentage of 1.2 per thousand in the month, or an annual mortality of 14.4, which is a slight increase over the preceding two months, but sufficiently low to indicate a very favorable condition of the public health.

CONSUMPTION, as usual, heads the list with one hundred and forty-seven deaths, nearly one seventh of the total mortality.

PNEUMONIA caused fifty-four deaths, which is about the average of the preceding month.

BRONCHITIS is credited with nineteen deaths, sixteen of which occurred in San Francisco, two in Alameda, and one in Oroville.

CONGESTION OF THE LUNGS caused nine deaths.

WHOOPING-COUGH was fatal in four instances—one case each in Napa and Nevada City, and two in San Francisco.

DIPHTHERIA AND **CROUP**, collectively, caused thirty-five deaths. Of these, ten were reported as membranous croup. San Francisco reported ten deaths from these causes, Los Angeles six, Nevada City four, Santa Ana three, Oakland four, and Santa Barbara, San Bernardino, Pasadena, Napa, Healdsburg, Elk Grove, Fresno, and Downey one each.

DIARRHŒA AND **DYSENTERY** do not indicate any increase of mortality; twenty deaths only were ascribed to them.

CHOLERA INFANTUM shows a further increase of mortality during the month, no less than thirty-three deaths being credited to it. The weather during a part of the month being exceedingly wet, with an unusually high temperature, it may have been a factor in increasing the frequency of the disease and determining its fatality. However, the mortality is unusually high for October.

SCARLET FEVER caused four deaths—three of them in San Francisco and one in Alameda.

MEASLES caused no deaths.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER was fatal in four instances.

TYPHOID FEVER was fatal in forty-eight instances, which is a notable increase over the mortality for September, and indicates the extension of the disease over a large area of country.

REMITTENT AND INTERMITTENT FEVERS have attributed to them seven deaths.

CEREBRO-SPINAL FEVER caused seven deaths.

CANCER is credited with forty-eight deaths during the month.

HEART DISEASE caused seventy deaths.

ALCOHOLISM was the cause of nine deaths.

PREVAILING DISEASES.

Reports received from one hundred and seven localities throughout the State, indicate an absence of any epidemic disease. They show, however, that intestinal disorders prevail to a considerable extent, and a marked increase of respiratory affections is apparent in the counties bordering on the coast, and in the higher altitudes.

CHOLERA INFANTUM is still mentioned in our reports from San Francisco, Lemoore, Marysville, Knights Ferry, Dixon, Salinas, Chico, Long Beach, Santa Maria, Petaluma, Rio Vista, Rocklin, Sacramento, Benicia, Oakland, San José, Fresno, San Diego, Pleasanton, and St. Helena. The cases were all sporadic, and limited in number.

DIARRHŒA AND DYSENTERY were noted as frequently observed in Calico, Susanville, Chico, Lodi, Lemoore, Lincoln, Redlands, Lockeford, Los Angeles, Sausalito, San Francisco, Salinas, El Monte, Oakdale, Anderson, Jackson, Placerville, Fresno, Jolon, Oakland, Shasta, Benicia, and Bakersfield. The type of these diseases was of a mild character without any tendency to epidemicity.

SMALLPOX.—Dr. R. W. Baum, of Placerville, reports that he was called to see two patients in a family about seven miles from Placerville, and discovered that they had varioloid. The disease was supposed to have been primarily carried from Carson Valley, but in so mild a form that the parties did not deem the advice of a physician necessary. They, however, returned home with the eruption upon them, and fourteen days afterward the patients to whom Dr. Baum was called developed the disease. Fortunately they lived off from the public road, and Dr. Baum has taken so much precaution to have them properly isolated and quarantined that an extension of the disease beyond its present limits is very unlikely. No other cases were reported within the State during the month.

MEASLES in a limited number of cases was reported in Fresno and Chico.

SCARLET FEVER was quite prevalent in San Francisco; it was also reported in Alameda, Oakland, Salinas, Merced, Antioch, Rocklin, and Sacramento. In Alameda, the Health Officer, Dr. J. T. McLean, believes the disease to have been spread by the carelessness of parents in permitting children having the disease in a mild form to attend school, no physician being called in these cases, and consequently not reported to the Health Officer, as they should be. In Alameda, the Board of Health has very properly passed an ordinance requiring a placard, three by six inches, to be placed conspicuously on every dwelling containing any case of scarlet fever, diphtheria, or smallpox, making it a penal offense to remove such notice until all danger of infection had ceased. This precaution is eminently proper, and should be adopted by every Health Board and Health Officer in the State. Such notification of disease would save many lives, and be an efficient means of arresting the spread of these disorders where otherwise they might become epidemic.

DIPHTHERIA AND CROUP are noticed as having occurred during the month in reports from Truckee, Eureka, Los Angeles, San Francisco, Oakland, Elk Grove, Sacramento, Santa Ana, Downey, Nevada City, Soledad, Mariposa, San Bernardino, Healdsburg, Napa, Santa Barbara, Fresno, and College City.

As the evidence increases of the local character of diphtheria in its inception, and the great probability of the destruction of the infecting material by germicidal remedies immediately applied, the urgent necessity of calling in a medical man in every instance of sore throat, to determine its character, is apparent, the arrest of the disease being dependent upon the early recognition of its character. If delay is permitted and time given for the poisonous deposit to be absorbed into the blood, systemic infection takes place, all the deleterious effects of the disease are centered, and its power of multiplication correspondingly increased. Early recognition is the first step towards stamping out diphtheria.

WHOPING-COUGH is mentioned in our reports from Lemoore, Napa, Eureka, San Francisco, Sausalito, Fresno, Merced, Hollister, Nevada City, and Mariposa. In the latter city it is quite prevalent, but of a mild type.

ERYSIPELAS, in a sporadic form, was noticed in Chico, Truckee, Eureka, San Francisco, Santa Ana, Sausalito, Angels Camp, Fresno, Anaheim, St. Helena, and Hollister.

TYPHOID FEVER was noticed in a great many places. In Los Angeles very many cases occurred in the orphan asylum, which may be attributed to defective sewerage, or other local causes. This disease was also noted in Brownsville, Santa Paula, Knights Ferry, Chico, Lodi, Truckee, Rocklin, Napa, Sacramento, Etna Mills, Santa Barbara, San Francisco, Dixon, Ontario, Angels Camp, Pleasanton, Fresno, Anaheim, Merced, Traver,

Antioch, San Juan, and Oakland. Its range is quite extensive, but the cases all seem sporadic, without any epidemic tendency.

TYPHO-MALARIAL FEVER was noticed in reports from Santa Cruz, Igo, Truckee, Oakdale, Anderson, Shasta, Red Bluff, and Cottonwood.

REMITTENT AND INTERMITTENT FEVERS are lessening in frequency, but prevail to some extent along the rivers and in the lowlands.

PNEUMONIA has become quite prevalent everywhere, and was noticed in Cottonwood, Susanville, Chico, Lemoore, Truckee, Eureka, Los Angeles, San Francisco, Sausalito, Salinas, Anderson, Fresno, Merced, Nevada City, Grass Valley, Gonzales, Mariposa, Bakersfield, and Red Bluff. The type is quite severe, but the fatality is limited, considering the number of persons attacked.

BRONCHITIS is mentioned in reports from Brownsville, Santa Cruz, Lodi, Igo, Lemoore, Eureka, College City, Anderson, Fresno, Redding, Benicia, San Francisco, Oakland, Sacramento, and Williams.

CONSUMPTION.—Our remarks in the monthly circular of last month, regarding the contagiousness of this disease, and the undesirability of inviting its victims to this coast, seems to have given great umbrage to our southern neighbors, who seem to look upon the solicitude of the State Board of Health for the sanitary welfare of the State as a direct blow to their prosperity, and an endeavor to prevent the immigration of diseased persons into their midst. The State Board has no such desire or power; it can only advise the public of the danger incurred from the promiscuous mingling of consumptives with healthy people, which is its duty. M. Delargy, in a paper contributed to the "Journal Hygiene," points out that certain mountain regions in Europe, formerly exempt from phthisis, have now become infected since intercourse with cities and phthisical localities have been furnished, and considers the crowding together of a large number of phthisical cases, in the most healthy localities, will soon have an unfavorable effect upon the purity of the atmosphere. Indeed, it may be said that consumption is never contracted except by contact, by association, or by living in close proximity. The length of time consumed by phthisis before proving fatal, enables it to infect all susceptible persons coming in contact with it, hence its great danger when not isolated. Cadeac and Malet, by experiment, proved that tubercular matter, dried and pulverized, was capable of transmitting the disease one hundred days after such preparation, and Pietro asserts that tubercular matter will retain its virulence ten months after drying. Desiccation or drying of the sputa seems to be the most effective way of disseminating the disease. Cornet found that of three hundred and eleven animals inoculated with the dust scraped from the rooms occupied by phthisical patients, one hundred and sixty-seven died soon after; of these, one fifth were found to be tuberculous. He says, further, that a phthisical patient, to be innocuous, must never, under any circumstances, expectorate upon the floor, or into a handkerchief, but always into a spittoon cup containing water, which must be disinfected and frequently changed. The danger of contagion from consumption is not exaggerated; preventive measures are as applicable to the south as they are to any other part of California, and the State Board of Health would be derelict in its duty if it did not point out this fact and call public attention to the necessity of caution in dealing with it.

PACIFIC COAST WEATHER.

The most marked meteorological feature of the month is the excessive rainfall occurring throughout California, which, over the greater part of the State, was more than double the heaviest October rainfall previously recorded. This large rainfall resulted in many localities in serious damage to crops, particularly in the case of raisins and table grapes. Rain fell in Northern California on the 7th, 8th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 25th, 26th, 27th, and 29th; in Southern California on the 8th, 13th, 18th, 20th, 21st, 22d, 23d; and in Oregon and Washington Territory on the 1st, 6th, 7th, 8th, 9th, 10th, 14th, 21st, 22d, 23d, 24th, 26th, 27th, 28th, 29th, and 30th.

TEMPERATURE.—The month was an unusually warm one in all of the Pacific Coast districts, the least departure from normal temperature occurring in Northern California. Mean temperature at selected stations was: Portland, Oregon, 57 degrees; Sacramento, Cal., 62 degrees; San Francisco, 62 degrees; Fresno, 63 degrees; Los Angeles, 66 degrees; San Diego, 65 degrees.

RAINFALL.—The rainfall was in excess of the normal amount south of a line drawn diagonally across Oregon from Portland to the southeast, and was less than the average October rainfall north of that line.

NOVEMBER, 1889.

Reports received from one hundred and four localities, with an estimated population of eight hundred and eighty-four thousand four hundred, give the number of deaths as nine hundred and ninety-two, which is a percentage of $1.17 +$ per thousand in the month, or an annual mortality at the rate of $14.04 +$, which is a remarkably small death rate, and indicates a most favorable condition of the public health.

CONSUMPTION is credited with causing one hundred and fifty-six deaths during November, or little less than one sixth of the total mortality of the State for the month.

PNEUMONIA, being quite prevalent, caused sixty-three deaths, which is an increase over last report.

BRONCHITIS.—The mortality from this disease also shows an increase, thirty-eight deaths being recorded from it.

CONGESTION OF THE LUNGS caused twelve deaths.

WHOOPIING-COUGH was fatal in four instances—three in San Francisco and one in Los Angeles.

DIPHTHERIA AND CROUP, collectively, caused forty-nine deaths, which is a large increase from last report. Of these, eighteen occurred in San Francisco, twelve in Los Angeles, four in Santa Barbara, two in Oakland, two in Santa Ana, two in Sacramento, two in Gonzales, and one each in Benicia, Gold Run, Downey, Pomona, and Redding.

DIARRHŒA AND DYSENTERY were fatal in eleven cases, which is a decrease from the mortality caused last month by these diseases.

CHOLERA INFANTUM also shows a marked decrease from last report, nineteen deaths being recorded in November and thirty-three in October.

SCARLET FEVER had the small mortality of four.

MEASLES caused no deaths.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER is credited with eight deaths.

TYPHOID FEVER caused forty deaths, which is a slight decrease from the mortality in October.

REMITTENT FEVER caused but two deaths.

CEREBRO-SPINAL FEVER is credited with nine deaths.

CANCER was fatal in thirty instances.

HEART DISEASE caused seventy deaths.

ALCOHOLISM is credited with eight deaths during the month.

The following towns reported *no deaths*: Alturas, Brownsville, Anaheim, Calico, Castroville, College City, Folsom, Kingsburg, Knights Ferry, Lincoln, Lakeport, Long Beach, Merced, Needles, North Bloomfield, San Pedro, Sausalito, Sierra City, and Wheatland.

PREVAILING DISEASES.

Reports received from over one hundred localities throughout the State continue to show a favorable condition of the public health. During the earlier part of the month disorders of the bowels seemed generally to prevail, but after the excessive rainfall in the latter part of November, diarrheal disorders were not noticed so frequently as diseases of the respiratory system, which prevailed in quite a number of localities.

DIARRHŒA AND DYSENTERY were noticed in reports from Knights Ferry, Newcastle, Hollister, Eureka, Needles, Oakdale, Downey, Redlands, Chico, Colton, Santa Paula, Traver, Lemoore, Redding, El Monte, San Bernardino, Salinas City, Fresno, Downieville, San Diego, Rio Vista, Stockton, and San Francisco.

CHOLERA INFANTUM was mentioned in reports from Salinas City, Knights Ferry, Lemoore, Needles, Fresno, San José, Ventura, Santa Ana, and San Francisco. The number of cases were exceedingly limited, and due in most instances to local causes.

SMALLPOX.—One case of this disease was reported from Humboldt County.

MEASLES appeared during the month in Livermore, Chico, Williams, and Sausalito.

SCARLET FEVER.—Some sporadic cases of this disease were reported in Livermore, Monrovia, Sacramento, Rocklin, San José, Alameda, Oakland, and San Francisco.

WHOOPIING-COUGH was reported as present in Anaheim, Chico, Sausalito, and Mariposa.

ERYSIPELAS, in sporadic form, was noticed in Brownsville, Eureka, Calico, Needles, Livermore, Downey, Ontario, Soquel, Cottonwood, Lemoore, Truckee, Redding, Fresno, Merced, San Bernardino, San Diego, and Stockton.

TYPHOID FEVER was reported from Sacramento, Brownsville, Needles, Livermore, Cedarville, Redlands, Monrovia, Chico, Santa Cruz, Jolon, Lodi, Traver, El Monte, Dixon, Etna Mills, Salinas, College City, Fresno, Merced, Grass Valley, Los Angeles, Nevada City, Oakland, San José, Santa Rosa, Sisson, Watsonville, Woodland, and San Francisco.

REMITTENT FEVER was noticed in reports from Fresno, Ontario, Traver, Chico, Lemoore, San Bernardino, Truckee, Lockeford, Sausalito, Cottonwood, Lodi, Knights Ferry, and Hanford.

CEREBRAL FEVER.—Some cases of this disease were noticed in reports from Downey, Dixon, Napa, San Bernardino, Hollister, Oakland, San Francisco, Watsonville, and San José.

PNEUMONIA was quite prevalent during the month, and was observed with some frequency in Brownsville, Oakdale, Cedarville, Downey, Chico, Traver, Dixon, Sausalito, Truckee, Watsonville, Mariposa, Salinas, Fresno, College City, Alameda, Auburn, Cottonwood, Hanford, Hollister, Los Angeles, Nevada City, Oakland, San José, Stockton, Santa Rosa, and San Francisco.

BRONCHITIS was noticed in reports from Los Angeles, Hollister, Eureka, Vallejo, Livermore, San Pedro, Cloverdale, Ontario, Chico, Biggs, Sierra City, Williams, Lemoore, Redding, Fresno, Castroville, Alturas, San Bernardino, College City, El Monte, Pomona, Santa Barbara, Soquel, and San Francisco.

DIPHTHERIA AND CROUP were reported in Downey, Needles, Anaheim, Monrovia, Los Angeles, Santa Cruz, Jolon, Truckee, Gold Run, Redding, Mariposa, Salinas, Soledad, Ontario, Lockeford, Benicia, College City, Fresno, Santa Barbara, El Monte, Gonzales, Santa Ana, Oakland, Sacramento, and San Francisco.

In Gold Run, Placer County, there has been quite an epidemic of the disease, which Dr. Miner attributes to the bad sanitary condition of the town, and the neglect of sanitary precautions in isolating those attacked. It is very evident to all right thinking people that if we desire to limit the spread of contagious and infectious diseases, such as diph-

theria, scarlet fever, smallpox, typhoid fever, etc., a law upon the statute book will be necessary, making it compulsory upon all physicians, nurses, or householders, to notify the health authorities of the presence of infectious or contagious disease whenever it occurs within their knowledge. If we had such a law, and the failure to notify was punished by fine and imprisonment, we would, by timely notification, be enabled to confine the disease to its place of origin by isolation, and subsequently, by disinfection, to destroy the contagion before it had time to get abroad. We will grant that with measles and whooping-cough this would be most difficult, as their most infectious stage is just before the outbreak of the eruption in one case, and of the typical cough in the other. In these cases the contagion would be almost sure to have been diffused to a greater or less extent before the diagnosis of the diseases could have been made. But one of the most useful results of a law making the notification of infectious diseases compulsory, would be the fact that it would enable health officers to give timely warning of infected families to the school teachers and Trustees, so that the children of such families could be excluded, for the time being, from the public school, and the spread of infection stayed. From the culpable carelessness with which children from infected premises, or even with the first symptoms of illness upon them, are allowed to attend school, we cannot wonder that diphtheria and scarlet fever are spread. Of course a great deal of this is through ignorance of the dangerous nature of the infecting disease, and because it is generally unknown that the mildest attack in one child may produce the most malignant disease in another. Sanitary education will in time remove this difficulty, especially when the fact is fully recognized that these infectious diseases can be wholly controlled by timely precaution and proper quarantine measures.

PACIFIC COAST WEATHER.

WEATHER.—The first half of the month was marked by a general absence of rain, almost the entire rainfall for the month having fallen since the 17th. Rain fell in Oregon and Washington on the 9th, 10th, 11th, 12th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, and 30th; in Northern California on the 17th, 18th, 19th, 20th, 21st, 22d, 29th, and 30th; and in Southern California on the 18th, 19th, 29th, and 30th.

TEMPERATURE.—The mean monthly temperature at all stations was higher than usual, the least departure from the normal temperature occurring along the coast of Northern California. Mean monthly temperatures at selected stations were: Portland, Oregon, 48 degrees; Roseburg, Oregon, 47 degrees; Red Bluff, California, 54 degrees; Sacramento, California, 54 degrees; San Francisco, 59 degrees; Fresno, California, 54 degrees; Los Angeles, California, 61 degrees; San Diego, California, 62 degrees.

RAINFALL.—Throughout southwestern Oregon and Northern California the rainfall for the month was in excess of the normal amount. In other districts the deficiency was small, except in eastern Washington and the extreme southern portion of California.

DECEMBER, 1889.

Mortality reports received from ninety-four localities, containing an estimated population of seven hundred and eighty-one thousand nine hundred, give the number of deaths as nine hundred and sixty-three, a percentage of 1.23 per thousand in the month, or an annual mortality at the rate of 14.76, which is a slightly increased rate over previous month, but sufficiently low to indicate how favorable the condition of the public health was during December, as Dr. Billings, in his work for the tenth census of the United States, estimates the annual death rate for the whole country to be eighteen in one thousand, and this under the most favorable conditions.

CONSUMPTION.—The mortality from this disease increased during the month to one hundred and seventy-one.

PNEUMONIA also increased its mortality to eighty-one deaths, forty-five of which occurred in San Francisco.

BRONCHITIS caused thirty-eight deaths, which is also an increase over previous month.

CONGESTION OF THE LUNGS was fatal in nine instances.

WHOOPIING-COUGH.—Only two deaths are reported from this cause—one in Stockton and one in San José.

DIPHTHERIA AND CROUP, collectively, caused thirty-five deaths—same number as in November. Eighteen of these occurred in San Francisco, three in Sacramento, three in Los Angeles, two in Redding, and one each in Anaheim, Colfax, Knights Ferry, Lakeport, Modesto, Riverside, San José, Santa Rosa, and Santa Cruz.

DIARRHŒA AND DYSENTERY were less fatal than usual, thirteen deaths only being recorded against them.

CHOLERA INFANTUM had the small mortality of seven.

SCARLET FEVER caused but one death.

MEASLES caused no deaths.

TYPHO-MALARIAL FEVER is credited with two deaths only.

TYPHOID FEVER.—Forty-four deaths are reported from this cause, a slight decrease from previous report, but indicating an extensive prevalence of the disease.

REMITTENT FEVER caused three deaths.

CEREBRAL FEVER was credited with seventeen deaths, which is more than double the mortality from this cause as reported in November. The severe cold and rain during the month may have been an exciting cause of the disease.

CANCER is credited with twenty-nine deaths during the month.

HEART DISEASE caused sixty-five deaths.

ALCOHOLISM was fatal in four instances.

The following towns report *no deaths*: Calico, Downieville, Etna Mills, Elk Grove, Elsinore, Forest Hill, Galt, Jolon, Merced, Ontario, Soquel, Ukiah, and Williams.

PREVAILING DISEASES.

Reports received from one hundred localities indicate an absence of serious epidemic diseases within the State. The extreme moisture and cold, which prevailed during the month, increased in a marked manner the frequency of all affections of the respiratory organs, with a corresponding fatality from consumption, pneumonia, and bronchitis.

DIARRHŒA AND DYSENTERY, in a sporadic form, were noticed with some frequency in Eureka, Livermore, Pleasanton, Lemoore, Needles, Downey, Angels Camp, Susanville, St. Helena, Sausalito, El Monte, Fresno, Los Angeles, Oakland, Sacramento, and San Francisco.

VARICELLA, OR CHICKENPOX, was present in Truckee and Sacramento.

MEASLES was observed in Colfax, Williams, Angels Camp, Pleasanton, Sausalito, and Dixon; in the latter town it may be said to be epidemic.

SCARLET FEVER, in mild form, was reported in Riverside, San Francisco, Elk Grove, and Benicia.

DIPHTHERIA AND CROUP were quite frequently reported; the cases were all sporadic, and nearly in every instance confined to their place of origin. The contagious nature of the disease is very generally acknowledged, hence more care is taken to prevent its spread, and as a consequence we have no epidemic reported. These diseases were present during the month in San Francisco, Los Angeles, Downey, Anaheim, El Monte, Monrovia, Santa Cruz, San José, Santa Rosa, Salinas, Sacramento, Eureka, Redding, Colfax, Lodi, Lakeport, Anderson, Fresno, Rocklin, Modesto, and Knights Ferry.

WHOOPIING-COUGH was epidemic in Napa, and many cases were noted in Santa Cruz, Sacramento, Mariposa, Jolon, Sausalito, Fresno, Stockton, and San José.

ERYSIPELAS, in sporadic form, was noticed in Sacramento, Downey, Livermore, Angels Camp, Pleasanton, Truckee, Fresno, Igo, Cottonwood, Soquel, San Bernardino, Anaheim, Forest Hill, Long Beach, and San Francisco.

TYPHOID FEVER was quite prevalent throughout the State, and was reported in San Francisco, Los Angeles, Sacramento, Selma, Angels Camp, Pleasanton, Knights Ferry, Merced, Etna Mills, Jolon, Sausalito, El Monte, Monrovia, Newcastle, Cedarville, Santa Paula, Wheatland, Marysville, Woodland, Santa Barbara, Oakland, Healdsburg, Kingsburg, Needles, and Napa.

TYPHO-MALARIAL FEVER was reported in Santa Cruz, Lemoore, Angels, Igo, Merced, Rio Vista, and Anderson.

REMITTENT AND INTERMITTENT FEVERS were observed in Lemoore, Knights Ferry, Lodi, Newcastle, Rio Vista, Anderson, and San Francisco. The severe rainfall has lessened the frequency of these paludal fevers, those now prevailing being very mild in character, and chiefly occurring in those persons subject to malarial attacks.

CEREBRO-SPINAL FEVER is mentioned in reports from Lockeford, Truckee, Oakland, San Francisco, Angels Camp, Anaheim, Healdsburg, Knights Ferry, and Marysville.

PNEUMONIA was observed with some frequency in Cedarville, Fresno, Dixon, Salinas, Eureka, Benicia, Williams, Redding, Needles, Downey, Pleasanton, Angels Camp, Lockeford, Watsonville, Susanville, Lakeport, Anaheim, Mariposa, El Monte, San Bernardino, Newcastle, Sacramento, Oakland, San José, and San Francisco.

BRONCHITIS was also reported in San Francisco, Sacramento, Oakland, Lemoore, Pleasanton, Livermore, Calico, Benicia, Williams, Redding, El Monte, Lockeford, Mariposa, Susanville, Lakeport, Anaheim, Watsonville, San Bernardino, Los Angeles, Newcastle, San José, Placerville, and Chico.

INFLUENZA was quite prevalent throughout the State, although not having as yet attained the severity which characterizes the disease as reported from Europe and the Eastern States. It is undoubtedly the same disease, and will become epidemic, although the type may be milder. No deaths from it have yet been reported, but many of our correspondents agree upon the fact that the disease is characterized by that extreme debility which is likely to prove fatal to the debilitated, or those suffering from previous sickness, or in the very aged.

JANUARY, 1890.

Mortality reports received from ninety-four localities, containing an estimated population of eight hundred and one thousand seven hundred, give the number of decedents as one thousand three hundred and eighty-five, a percentage of 1.72 per thousand in the month, or an annual mortality at the rate of 20.64, which is the largest death record we have had for many years. The greatly increased mortality is not owing to any epidemic of what is usually called zymotic disease, but is attributable to a mysterious pandemic influence which renders the human system particularly liable to pulmonary disorders, and particularly fatal to those whose lungs are already diseased or which take on acute inflammation. We find, for instance, that during the month of January—

CONSUMPTION was fatal in two hundred and seventy instances. This is double the usual monthly mortality from this disease, and exemplifies the depressing influence of the epidemic catarrh which is now passing over the State.

PNEUMONIA caused no less than two hundred and twenty-eight deaths, which is more than double the usual monthly mortality. In San Francisco the deaths from this cause were one hundred and forty-one, and in Los Angeles, where the climate is particularly favorable to these cases, the deaths numbered eighteen; in Sacramento, with an equally good climate, the deaths were seven; and in Santa Barbara five deaths occurred from this cause.

BRONCHITIS is credited with fifty-seven deaths, which is also a large increase over former reports.

CONGESTION OF THE LUNGS caused twenty-seven deaths, which is likewise in marked excess of the usual fatality.

WHOOPING-COUGH caused but one death.

DIPHTHERIA AND CROUP, collectively, caused forty deaths, which is a slight increase over the report for December. Of these deaths, twenty-three occurred in San Francisco, seven in Los Angeles, three in Nicolaus, and one each in Chico, Sacramento, Oakland, San Luis Obispo, Stanislaus, Stockton, and Truckee.

DIARRHŒA AND DYSENTERY caused only eleven deaths, which is a very much lessened fatality from these diseases.

CHOLERA INFANTUM was fatal in but three instances.

SCARLET FEVER caused five deaths in San Francisco, one death in Alameda, and one in Santa Barbara.

MEASLES was fatal in four instances—two in San Francisco, one in Angels Camp, and one in Pleasanton.

TYPHO-MALARIAL FEVER is credited with two deaths.

TYPHOID FEVER.—Twenty-eight deaths are reported from this disease, which is a decrease of one half from the mortality reported during December.

REMITTENT AND INTERMITTENT FEVERS caused six deaths.

CEREBRAL FEVER is reported to have caused eleven deaths. Of these, two occurred in Oakland, one each in San Francisco, Alameda, Fresno, Lemoore, Martinez, Napa, Petaluma, San José, and San Luis Obispo. This is a decreased mortality from the December report.

CANCER is credited with thirty-four deaths during the month.

ERYSIPELAS caused but one death.

HEART DISEASE was fatal in ninety-three instances.

ALCOHOLISM was the cause of twenty deaths.

PREVAILING DISEASES.

Reports received from ninety-eight different localities in the State indicate an extremely limited prevalence of zymotic diseases, such as diphtheria, scarlet fever, measles, typhoid, and kindred specific affections, those mentioned being few in number and sporadic in character, whereas diseases of the respiratory organs, dependent in some measure upon meteorological conditions, exhibit a frequency and fatality which is phenomenal in this State. That this is owing to the great pandemic wave of epidemic catarrh, which is now spreading all over the State, rendering the populace more susceptible to inflammatory affections of the lungs, may be accepted as the probable explanation of the unusual frequency of the respiratory diseases which have prevailed during the past month. Those suffering from consumption were affected in a remarkable degree, prostration being the most noticeable symptom, and this often so severe that death ensued in a few days.

PNEUMONIA prevailed extensively throughout the State; was quite frequent in San Francisco, Oakland, Alameda, San José, Stockton, Sacramento, Los Angeles, San Diego, Watsonville, Downey, Fresno, Merced, Santa Barbara, Calico, Salinas, Eureka, Marysville, Anderson, Dixon, Ione, Benicia, Truckee, Chico, Lockeford, Kingsburg, Napa, Angels Camp, Lakeport, Redding, Galt, Nicolaus, Lemoore, and other towns.

BRONCHITIS was likewise very prevalent in Eureka, Benicia, Watsonville, San Francisco, Dixon, St. Helena, Pleasanton, Anaheim, Needles, Truckee, Santa Paula, Williams, Colfax, Colton, Cottonwood, Lemoore, Redding, Galt, Lodi, College City, El Monte, Calico, Fresno, Forest Hill, Merced, Los Angeles, Oakland, Sacramento, San José, San Luis Obispo, and Santa Barbara.

WHOOPING-COUGH does not prevail to any extent; it is mentioned in reports from Mariposa, Sausalito, Jolon, Igo, Lemoore, Merced, and San Francisco.

DIPHTHERIA AND CROUP are not prevailing extensively; in Nicolaus, Sutter County, there was quite a number of cases, the origin of which was not reported. In San Francisco there were only seventeen cases reported during the month. Sporadic cases were also reported in Eureka, Anderson, Truckee, Benicia, Downey, El Monte, Fresno, Salinas, Chico, Oakland, Sacramento, San Luis Obispo, Stockton, and Stanislaus County.

SCARLET FEVER, in sporadic form, was noticed in Fresno, Chico, and San Francisco.

MEASLES was present in Ione, Pleasanton, Sausalito, Angels Camp, Livermore, and Fresno. The disease is reported as very mild, without any tendency to epidemicity.

SMALLPOX is absent from the State, no cases being reported.

ERYSIPELAS, in a mild form, was noticed in reports from Shasta, Benicia, Chico, Truckee, Downey, Igo, Colton, Lemoore, Hollister, Livermore, Calico, Salinas, and San Francisco.

CHOLERA INFANTUM is no longer reported as prevailing anywhere. A few cases were observed in Ione and San Francisco, but practically it is absent from the State.

DIARRHŒA AND DYSENTERY no longer occupy a prominent place among the prevailing diseases. A few cases were noticed in Ione, Anderson, Shasta, Santa Paula, Downey,

Oakdale, Colton, Sierra City, Lemoore, El Monte, Newcastle, Placerville, and San Francisco.

TYPHOID FEVER is reported as observed in few instances in Anderson, Pleasanton, Chico, Ontario, Angels Camp, Igo, Colton, Cottonwood, Lodi, Merced, Salinas, Newcastle, Oakland, San Francisco, Santa Barbara, Los Angeles, and Tulare City. The late extensive rains seem to have had a salutary effect in diminishing the frequency of this fever, the reports of its prevalence during the past month being very meager.

REMITTENT AND INTERMITTENT FEVERS were observed in Anderson, Lone, Kingsburg, Chico, Truckee, Nicolaus, Cottonwood, Lemoore, El Monte, Fresno, and Knights Ferry.

CEREBRAL FEVER was noticed in a few sporadic cases in San José, San Luis Obispo, San Francisco, Petaluma, Oakland, Martinez, Napa, Alameda, Fresno, and Lemoore.

INFLUENZA, EPIDEMIC CATARRH, OR LA GRIFFE, prevailed extensively throughout the State from San Diego to Siskiyou. Dr. Tully, in a letter from Sierra City, says that it is there characterized by its tendency to attack the bronchial tubes and the substance of the lungs, but so far no deaths have occurred from it. In Gonzales, Dr. Hertel reports the disease as abating. In Salinas, Dr. May Gydison reports the disease as epidemic. Dr. Hayden reports a large number of cases in Fresno. Dr. Tebbits reports it epidemic in Hollister. Dr. Taggart also reports it epidemic in Tulare. In Redding, Dr. Mitchell says the disease is in a mild form, few cases requiring medical assistance. In Marysville, Dr. Powell reports influenza, but does not think it the genuine *la grippe*. The majority of our correspondents report the disease in a mild form and without fatality. Its mode of attack differs in many particulars. It may manifest itself by sneezing, headache, chilliness, cough, sore throat, earache, vomiting, or diarrhoea, or constipation, fever, dizziness, pain in the limbs, or nervous twitching, but none of these symptoms are constant. Heaviness over the eyes, redness of the eyeballs, intense pain in the back, in the limbs, and through the muscles, with a feeling of constriction round the throat or chest, are the commonest symptoms observed in *la grippe*. Its chief characteristic is, however, the extreme debility and prostration which accompanies its advent. This, with intense mental depression and profuse sweating, protracts the convalescence much longer than it might be supposed; and although the fever, headache, and muscular pains last but a few days under proper medical treatment, the heart depression, muscular weakness, and nervous debility take some time to overcome. As the cause of the disease is at present unknown, we can advise no means of prevention, but would recommend that medical advice be sought in all cases, as those suffering from previous disease, or debilitated from any cause, are very apt to succumb to a severe attack of *la grippe*, owing to the intense nervous prostration that ensues, and the tendency to heart failure that always accompanies the disease. Under proper stimulation this may be overcome, but to administer stimulants judiciously requires an educated judgment and a perfect comprehension of the object to be attained.

PACIFIC COAST WEATHER.

WEATHER.—The month has been marked by excessive precipitation and low temperatures throughout the Pacific Coast States. Rain or snow fell in Southern California on the 3d, 4th, 5th, 13th, 17th, 18th, 21st, 25th, and 26th; in Northern California on the 1st, 2d, 3d, 4th, 5th, 10th, 12th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 27th, and 30th, and in Oregon and Washington on all days except the 4th, 5th, 7th, 20th, and 21st.

TEMPERATURE.—At all stations the mean temperature for the month was lower than usual, the greatest departures from the normal occurring in Nevada and eastern Oregon, and the least in Southern California. Mean temperatures at selected stations were as follows: Spokane Falls, Washington, 18 degrees; Portland, Oregon, 32 degrees; Sacramento, California, 43 degrees; San Francisco, California, 46 degrees; Fresno, California, 42 degrees; San Diego, California, 51 degrees.

RAINFALL.—The rainfall for the month was in excess of the average January rainfall in all districts, and added to the heavy rains of October and December, makes the seasonal rainfall over the greater portion of California, from two to three times the normal amount.

FEBRUARY, 1890.

Mortality reports received for the month of February from one hundred and three localities, with a population estimated at eight hundred and twenty-two thousand nine hundred and fifty, give the number of decedents as eleven hundred and fifty-six, a monthly percentage of 1.44 per thousand, or a mortality at the rate of 17.28 per annum, which is a marked decrease from the mortality record in January, which gave an annual death rate of 20.64. It will be noticed, however, that diseases of the respiratory organs still occupy the most prominent place in the history of causation.

CONSUMPTION heads the list with two hundred and forty-nine deaths. This is a decrease of twenty-one from January report.

PNEUMONIA also presents the large mortality of one hundred and sixty deaths. Nevertheless, it is a decrease of sixty-eight from last report. Eighty-eight of these deaths occurred in San Francisco, eight in Sacramento, six in Oakland, five in Los Angeles, four in San José, and the remainder in smaller numbers in different parts of the State.

BRONCHITIS is credited with thirty-eight decedents. This is also a reduction of nineteen deaths from last report, although it is much in excess of the usual mortality record from this disease.

CONGESTION OF THE LUNGS was fatal to twelve persons, which is about half the mortality of previous month.

WHOOPING-COUGH caused six deaths, which indicates an increase in the disease.

DIPHTHERIA AND CROUP, collectively, were fatal in eighteen instances, which is a marked decrease from fatality in January, when forty deaths were registered from these diseases.

DIARRHŒA AND DYSENTERY caused but five deaths, according to reports received. This is an unusually small death rate.

CHOLERA INFANTUM caused four deaths in San Francisco, the only ones reported in the State as far as heard from.

SCARLET FEVER was fatal in one instance only, and that in Oakland.

MEASLES.—Three deaths in San Francisco were reported from this cause.

TYPHO-MALARIAL FEVER was fatal in one instance, in Alameda.

TYPHOID FEVER is credited with twenty deaths, which is a decrease from January report.

REMITTENT AND INTERMITTENT FEVERS caused one death.

CEREBRO-SPINAL FEVER was fatal in five instances. Of these, three occurred in San Francisco, and two in Oakland.

CANCER caused twenty-two deaths.

ERYSIPELAS was fatal in but two instances—one in Lodi and one in Sacramento.

HEART DISEASE was fatal in eighty-one cases.

ALCOHOLISM was the cause of eight deaths.

PREVAILING DISEASES.

Reports of sickness observed in over one hundred localities throughout the State indicate a very well marked subsidence in the frequency and fatality of diseases of respiratory organs. The notes of a number of our correspondents convey the impression that in a majority of the districts heard from, the condition of the public health was much more satisfactory than was to be expected, considering the extremely inclement weather that prevailed throughout the month. The decrease in the prevalence of disorders of the bowels was quite noticeable, especially cholera infantum, which is hardly mentioned. The absence from our reports of typhoid fever as a prevailing disease is remarkable, and in some degree confirmatory of the observations of authorities upon this subject, that a copious and continued rainfall so flushes and washes out the impurities of the soil and the receptacles of filth that typhoid fever becomes perceptibly lessened in its frequency, if not entirely absent, from localities in which it before was prevalent.

PNEUMONIA was reported as frequently observed in San Francisco, Oakland, Ontario, Williams, Colfax, Santa Paula, Redding, Biggs, Galt, Truckee, Sacramento, Watsonville, Etna Mills, Sausalito, Lodi, Lemoore, Lockeford, Colton, Livermore, Napa, Santa Cruz, Anderson, Chico, Middletown, Downieville, Eureka, Lakeport, Nicolaus, Fresno, Dixon, and Marysville.

BRONCHITIS also prevailed to a greater or less extent in Brownsville, Anaheim, Etna Mills, Williams, Pleasanton, College City, Igo, Sierra City, Galt, Truckee, Sausalito, Cottonwood, Lemoore, Lockeford, Lodi, Anderson, Chico, Susanville, Eureka, Colton, Fresno, Sacramento, Dixon, and San Francisco.

WHOOPING-COUGH is extending its field of operations. It is reported in San Francisco, Oakland, Sausalito, Stockton, Sacramento, Haywards, Napa, St. Helena, Mariposa, Jolon, Igo, and Los Angeles. The disease so far has proved very mild, and attended with very limited mortality.

DIPHTHERIA AND CROUP, as according to the very latest authorities they may be classed together as the same disease, were present during the month in a sporadic form in Anaheim, Oakdale, College City, Galt, Truckee, Eureka, Downey, St. Helena, Tehachapi, Salinas, and San Francisco. The disease was not epidemic in any locality reported, neither did it show any tendency to spread where it appeared. In San Francisco the cases reported were very limited in number and the mortality small.

SCARLET FEVER.—A few cases were reported in San Francisco, Oakland, Fresno, and Jolon.

MEASLES was observed in San Francisco, Pleasanton, Sausalito, Livermore, and Fresno.

SMALLPOX.—Dr. J. P. Booth writes that this disease was prevalent in Las Vegas, New Mexico, but was not allowed to pass the border, as far as could be ascertained. The fact of its appearance in New Mexico should warn us to prepare for its coming into this State again, and provide against its spread by vaccination and revaccination before it is too late. Health officers should see that all school children in their several districts comply with the law providing for vaccination, which is believed to be the most efficient mode of protection from this disease that the State is able to devise.

ERYSIPELAS in a mild form was observed in Hollister, Ontario, Pleasanton, Santa Paula, Sierra City, Truckee, Lodi, Livermore, Napa, Chico, Knights Ferry, Nicolaus, Tehachapi, Fresno, Salinas, and Newcastle.

CHOLERA INFANTUM was mentioned in but one report this month. It is practically absent from the State.

DIARRHŒA AND DYSENTERY were noticed in a few instances in Brownsville, College City, Sierra City, Anderson, Truckee, St. Helena, Colton, Tehachapi, Fresno, and Salinas. These diseases are not prevalent anywhere.

TYPHOID FEVER.—Sporadic cases of this disease were noticed in Etna Mills, Pleasanton, Santa Cruz, Jolon, San Francisco, Alameda, Oakland, Mariposa, Los Angeles, Nevada City, Pasadena, Petaluma, Pomona, San José, Yreka, Vallejo, and Sacramento.

REMITTENT AND INTERMITTENT FEVERS were noted in reports from Colton, Newcastle, Fresno, Knights Ferry, Chico, Anderson, Lockeford, Cottonwood, Galt, and Etna Mills. CEREBRAL FEVER was noted in Redding, Lockeford, San Francisco, and Oakland.

INFLUENZA is rapidly abating; although mentioned in nearly all of our reports as still present in the State, it is characterized by its mild form and general absence of fatality. Probably the next report will convey the intelligence of its total disappearance.

PACIFIC COAST WEATHER.

In Southern California the mean temperature for the month was slightly above the normal temperature for February, while in other Pacific Coast districts the month was slightly cooler than usual. Mean temperatures at selected stations were: Portland, Oregon, 38 degrees; Roseburg, 40 degrees; Red Bluff, California, 45 degrees; Sacramento, 48 degrees; San Francisco, 49 degrees; Fresno, 48 degrees; Los Angeles, 54 degrees; San Diego, 54 degrees.

Rain fell in Oregon and Washington on the 1st, 2d, 3d, 4th, 5th, 7th, 8th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 23d, 24th, 25th; in Northern California on the 4th, 5th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, and 25th; and in Southern California on the 16th, 17th, 18th, 21st, and 22d.

The rainfall for the month was least in Southern California, where it was about one half the usual amount, and gradually increased toward the north, becoming greatest in western Oregon, where it was about 40 per cent in excess of the normal rainfall.

MARCH, 1890.

Mortality reports received from one hundred and one localities, containing an estimated population of eight hundred and fifty-five thousand six hundred, give the number of decedents as eleven hundred and eighty-nine, a monthly percentage of 1.38 per thousand, or an annual mortality at the rate of 16.56 per thousand, which is a further decrease from the death rate in February, which was 17.28 per annum. Diseases of the respiratory organs still continue to add more than their quota to the bills of mortality, as they did in January and February. Their fatality is now on the decrease, although we find that—

CONSUMPTION caused the death of two hundred and thirty-three persons, which is nearly as great as the mortality of February.

PNEUMONIA likewise caused the death of one hundred and forty-three persons, which is a decrease of seventeen from last report, but yet far above the average deaths from this cause.

BRONCHITIS was fatal in forty-seven instances. This is an increase of eleven from last report, and indicates the great prevalence of the disease.

CONGESTION OF THE LUNGS was fatal in fifteen instances, which is a slight increase.

WHOOPING-COUGH caused five deaths, three of which occurred in San Francisco, one in Stockton, and one in Los Angeles.

DIPHTHERIA AND CROUP, collectively, caused twenty-eight deaths—thirteen from diphtheria and fifteen from croup. Of the former, eight occurred in San Francisco, two in Los Angeles, and one each in Elmira, Riverside, and San Luis Obispo. Of croup, ten died in San Francisco, two in Los Angeles, and one each in Sacramento, Riverside, and Petaluma.

DIARRHŒA AND DYSENTERY were fatal in eight instances only, which is a slight increase over last report, but still an unusually small mortality.

CHOLERA INFANTUM was not reported as having caused a single death, which is quite remarkable, as it is the first time it has failed to do so within the past year.

SCARLET FEVER was fatal in but one instance, and that in San Francisco.

MEASLES caused six deaths. Of these, four occurred in San Francisco, one in Vallejo, and one in Angels Camp.

TYPHO-MALARIAL FEVER was not reported as having caused any deaths.

TYPHOID FEVER was fatal in twenty-three instances, which indicates a slight increase over the mortality for February.

REMITTENT AND INTERMITTENT FEVERS are credited with two deaths only.

CEREBRO-SPINAL FEVER is reported to have caused thirteen deaths, which is a remarkable increase over the mortality of February. Three of these deaths occurred in San Francisco, two in Los Angeles, two in San José, and one each in Watsonville, Sacramento, Oakland, Alameda, Jackson, and Angels Camp.

ERYSIPELAS caused only two deaths.

CANCER was fatal in forty-one instances.

HEART DISEASE caused one hundred and two deaths.

ALCOHOLISM produced death in four instances.

PREVAILING DISEASES.

Reports received from one hundred and two different localities do not indicate much subsidence of the diseases of the respiratory organs so prevalent in January and February. Pneumonia, bronchitis, congestion of the lungs, and influenza were reported in almost every locality heard from. Influenza is, however, subsiding, and no longer par-takes of the epidemic form. The Health Officer in Trinity County reports the death of fourteen Chinamen from "la gripe," which is a remarkable circumstance, as the Chinese,

as a rule, do not seem to be as susceptible to the disease as the white people. It must, however, be recollected that the accuracy of Chinese statements as to the nature of disease is very liable to error, as our Health Officers can testify. We must, therefore, make a large allowance for mistaken diagnosis in all such statements from Chinese sources.

PNEUMONIA was observed with some frequency in Healdsburg, Antioch, El Monte, Tehachapi, Watsonville, San Pedro, Bakersfield, Ione, Fresno, Biggs, Jolon, Truckee, Dixon, Haywards, Middletown, Anderson, Lockeford, Angels Camp, San Francisco, Oakland, Alameda, Berkeley, Calico, Mariposa, Etna Mills, Los Angeles, Marysville, Nevada City, Sacramento, San José, Santa Ana, Stockton, and Woodland.

BRONCHITIS was quite prevalent in Sacramento, Dixon, Pleasanton, Healdsburg, Tehachapi, Biggs, El Monte, Bakersfield, Eureka, Ione, Fresno, Needles, Anderson, Galt, Lockeford, Shasta, College City, Middletown, Etna Mills, San Francisco, Oakland, San José, and Los Angeles.

WHOOPING-COUGH was reported in San Francisco, Stockton, Los Angeles, Mariposa, Napa, El Monte, and Sacramento. The disease continues to be very mild, and extending very slowly.

DIPHTHERIA AND CROUP.—Sporadic cases are reported in Stockton, Riverside, San Pedro, San Luis Obispo, Bakersfield, Livermore, Martinez, Truckee, Downey, Vacaville, Los Angeles, Petaluma, Sacramento, and San Francisco. The precautions that are now generally taken to isolate the patients afflicted with these diseases seems to be effective in preventing the spread of the infection, as no reports of the disease being epidemic in any locality have been received. In Riverside, Dr. Sherman reports the cases as more numerous than common. The type is probably mild, as the mortality is limited. In San Francisco diphtheria was more prevalent than in the preceding month.

SCARLET FEVER.—A few cases occurred in San Francisco. It is not reported as being present in any other locality.

MEASLES is reported as epidemic in Healdsburg. Some cases were also reported in El Monte, Fresno, Angels Camp, North Bloomfield, Nicolaus, Vallejo, and San Francisco.

SMALLPOX is not reported in California. The State Board of Health of Connecticut reports the disease in Meridian, in that State, to the number of nineteen cases. As this disease can be transported in clothing or baggage, the importance of our knowledge of the places of its existence cannot be overestimated. This object is attained through the National Conference of State Boards of Health adopting the resolutions to the effect that a duty is imposed upon each State to duly notify every other State of the existence of contagious and infectious diseases wherever in their respective States they may occur. We are thus enabled to watch the tide of travel from these infected districts and take all precautions possible to prevent the transportation of the disease to our borders.

ERYSIPELAS in sporadic form was noticed in El Monte, Lodi, Susanville, Fresno, Bakersfield, Eureka, Truckee, Anderson, Downey, Angels Camp, Nicolaus, Calico, Antioch, and San Francisco. The disease was of a mild type, with a very limited mortality.

CHOLERA INFANTUM was noticed in reports from Lodi, San Pedro, and Ione, but elsewhere throughout the State was not mentioned. As this disease is contemporaneous with increase of temperature, we cannot expect immunity from it much longer.

DIARRHŒA AND DYSENTERY were observed with some frequency in Eureka, Bakersfield, El Monte, San Pedro, Fresno, Cottonwood, Anderson, Pleasanton, Alameda, Modesto, Los Angeles, Truckee, Oakland, Placerville, and San Francisco.

REMITTENT AND INTERMITTENT FEVERS are becoming quite prevalent throughout the State. We noticed them mentioned in reports from Knights Ferry, Colfax, Lodi, Bakersfield, San Pedro, Ione, Fresno, Needles, Truckee, Cottonwood, Middletown, Anderson, Lockeford, Oakdale, Etna Mills, Oakland, and San Francisco.

CEREBRAL FEVER was noted in St. Helena, Rocklin, Susanville, Sacramento, San Pedro, Etna Mills, Angels Camp, Alameda, Jackson, College City, Los Angeles, Oakland, San Francisco, San José, and Watsonville.

TYPHOID FEVER is noted in our reports from Sacramento, Jolon, Lodi, San Pedro, Nicolaus, Etna Mills, Los Angeles, Petaluma, Oakland, San José, San Diego, Santa Ana, and San Francisco. The disease is not as prevalent as it will be when the ground begins to dry out after the excessive rainfall. We should, at this time, remember that the occurrence of unusual amounts of rain supersaturating the earth disturbs the contents of privies and cesspools, causing the carriage from these receptacles to be deposited in new localities, and perhaps at far distant points. Now, supposing any of the contents of these privies and cesspools contained the germs of typhoid fever, their deposition on the ground, and subsequent desiccation or carriage into our water supply, might be the cause of a serious epidemic. We know, at all events, that the putrefaction of organic matter is inimical to health, and the debris left after the subsidence of large accumulations of water should be removed from around our dwellings, our outhouses, our alleys, and our streets, carried away and buried deep or burned. The cleansing of our premises is now a wise precaution against future sickness, and as typhoid fever is peculiarly a filth disease, its mode of prevention is essentially cleanliness.

The typhoid germ can be swallowed in food as well as drank in water. Professor Vaughan, of the Michigan University, discovered the bacillus in sewer air, and Dr. Baker, the eminent Secretary of the State Board of Health of Michigan, contracted the disease, it is supposed, from the air of this very same sewer. Our Health Officers are therefore requested to urge upon their several districts the extreme necessity that exists at this time to remove all accumulations of debris and filth from about their habitations, as what are now comparatively harmless deposits, will, in the presence of increasing temperature, become masses of putrescent and dangerous organic matter, that is certain

to deteriorate the health and infallibly expose the system to a condition favorable to the receptivity of disease germs and their successful cultivation in the soil thus prepared for their accommodation and development. It is only by the education of the public to these dangers that we can hope to avoid them, and to the Health Officers the public look for such information, and such safeguards to its health, which their education in sanitation particularly enables them to supply and direct.

INFLUENZA, although very much lessened in the number of persons attacked, still lingers in the State, and occasionally shows itself with increased severity. It is probable that the warm weather advancing upon us will dissipate the disease completely, leaving us nothing but the memory of its presence.

PACIFIC COAST WEATHER.

The month has been one of frequent showers, with few severe storms. Rain fell in Oregon and Washington on the 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 16th, 17th, 18th, 19th, 22d, 23d, 25th, 26th, 29th, and 30th; in Northern California on the 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 18th, 19th, 22d, 23d, 25th, 29th, 30th; and in Southern California on the 8th, 18th, 19th, 20th, and 26th.

The temperature was about normal except in Southern California, where it was about 5 degrees higher than usual during March.

The mean temperature at selected stations was as follows: Portland, Oregon, 45 degrees; Roseburg, 46 degrees; Red Bluff, 51 degrees; Sacramento, 53 degrees; San Francisco, 54 degrees; Fresno, 55 degrees; Los Angeles, 58 degrees; San Diego, 56 degrees.

The rainfall was slightly in excess of the normal for March in Oregon, Washington, and Northern California, while in Southern California less than one half of the usual amount fell.

APRIL, 1890.

Mortality reports received from one hundred localities throughout the State, containing an estimated population of eight hundred and twenty-five thousand one hundred and fifty, give the number of decedents as ten hundred and thirty-seven, a monthly percentage of 1.28 per thousand, or an annual mortality at the rate of 15 per thousand, which is a marked decrease from the rate of the preceding three months, and indicates a decidedly favorable condition of the public health throughout the State. Diseases of the respiratory organs along the coast counties were quite fatal and added materially to the death rate. Deaths from zymotic diseases were quite limited, and added but a small fraction to the total mortality.

CONSUMPTION caused one hundred and seventy-eight deaths, which, while above the average, is considerably less than has occurred during the previous months from this cause.

PNEUMONIA is credited with one hundred and two deaths, which is also a decrease of over one third of those reported monthly since December. Seventy of these deaths occurred in San Francisco and eight in Oakland, the balance being in small numbers in different parts of the State.

BRONCHITIS caused fifty deaths, which is a slight increase from the number reported last month. Of these thirty-three occurred in San Francisco, four in Oakland, three in Los Angeles, the balance in small numbers here and there.

CONGESTION OF THE LUNGS is reported as causing ten deaths.

WHOOPING-COUGH was fatal in four instances.

DIPHTHERIA AND CROUP, collectively, caused twenty-seven deaths—seventeen from diphtheria and ten from croup. Of the former, thirteen occurred in San Francisco, one in Santa Rosa, one in Sacramento, one in Alameda, and one in Downey. Croup caused eight deaths in San Francisco, one in Los Angeles, and one in Healdsburg.

CHOLERA INFANTUM is credited with only two deaths—one in Anaheim, and one in San Francisco.

DIARRHŒA AND DYSENTERY were fatal in but six instances, which is a remarkably small mortality from these diseases, considering their frequency.

SCARLET FEVER was fatal in three instances in San Francisco.

MEASLES caused thirteen deaths in San Francisco. No other deaths reported from it.

TYPHO-MALARIAL FEVER caused no deaths.

TYPHOID FEVER is credited with twenty deaths, a slight decrease from March report.

REMITTENT FEVER.—One death from this cause is reported.

CEREBRO-SPINAL FEVER caused seventeen deaths, which is an increase over previous report. Of these deaths four occurred in Oakland, three in San Francisco, three in Los Angeles, two in Sisson, and one each in Santa Maria, Riverside, Oakdale, Lincoln, and Chico.

ERYSIPELAS caused only two deaths, both in San Francisco.

CANCER was fatal in thirty-two instances.

HEART DISEASE caused eighty-eight deaths.

ALCOHOLISM produced death in seven instances.

NO DEATHS were reported as having occurred in Alturas, Angels Camp, Biggs, Calico, Colusa, Cottonwood, Cloverdale, El Monte, Grass Valley, Hollister, Igo, Jolon, Little Stony, Nevada City, Newcastle, Orland, Rio Vista, Roseville, Sausalito, Shasta, Suisun, and Wheatland.

PREVAILING DISEASES.

Reports received from one hundred localities indicate a very favorable condition of the public health during the month of April, characterized by an entire absence of epidemic disease throughout the State, and a minimum amount of endemic zymotic disease wherever it did exist. The very favorable weather that prevailed throughout the month had a beneficial effect on the respiratory organs, and hence pneumonia was not so prevalent, although bronchitis continued to be observed quite frequently. Influenza has nearly disappeared, and is mentioned in but few reports.

PNEUMONIA, in sporadic form, was met with in Sacramento, Colfax, Livermore, Newcastle, Fresno, Chico, Bakersfield, Brownsville, Biggs, Lodi, Truckee, Middletown, San Juan, San José, Gridley, Mendocino, Oakland, Vallejo, Healdsburg, Riverside, Folsom, Pasadena, Petaluma, Pomona, Stockton, Davisville, and San Francisco.

BRONCHITIS was more or less prevalent in Downey, Merced, Colfax, Igo, San Bernardino, Lockeford, Fresno, College City, El Monte, Chico, Bakersfield, Mariposa, Brownsville, Pleasanton, Lodi, Middletown, Dixon, Eureka, Anaheim, Los Angeles, Lakeport, Oakland, San Francisco, Woodland, and Sacramento.

WHOOPING-COUGH was prevalent in Merced, Jolon, Fresno, El Monte, Lodi, Napa, Sausalito, Mariposa, Los Angeles, Oakland, Pomona, and San Francisco. The "Sanitary Record," in its last issue, justly says: "Whooping-cough is too often regarded in the light of a trifling and unavoidable malady, and it rarely happens that the slightest precaution is taken against its spread by infection. Some amount of blame moreover attaches to medical men, who, in many cases, fail to insist upon the necessity of isolation and disinfection. Yet the live contagion of whooping-cough is not less active, distinct, and subtle than that of scarlet fever or smallpox. * * * As in many other affections, although the number of deaths as immediate result of the disease is of itself great, yet it may be doubtful if the remote mortality is not much greater. The strain on the delicate lung tissues leads to emphysema and other grave complications that often prove fatal after the lapse of many years. Meanwhile, let parents be taught to regard this scourge in a truer light, by avoiding the bringing of their children in contact with the disease, where it can possibly, by diligent inquiry, be ascertained to be present."

DIPHTHERIA AND CROUP were not prevalent in any locality. Some sporadic cases were reported in San Francisco, Sacramento, Downey, Soledad, Healdsburg, Truckee, Anaheim, Alameda, Santa Rosa, Livermore, College City, Biggs, Lakeport, and Los Angeles.

SCARLET FEVER.—A few cases were reported in Livermore and San Francisco.

MEASLES was quite prevalent in San Francisco; it was also reported in Livermore, Santa Cruz, Fresno, El Monte, Healdsburg, Mariposa, Williams, Cloverdale, and Sausalito.

SMALLPOX.—No cases have yet appeared in California. Dr. J. P. Booth, our Sanitary Officer at Needles, reports that in Las Cruces, New Mexico, there were at the time of writing one hundred and fifty cases, and the deaths very numerous. As this town is on the line of the Santa Fe Railroad, the disease may come in by the way of Yuma. We ought, therefore, to be forearmed by the vaccination of those unvaccinated, and especially the children attending the public schools, as the law provides.

ERYSIPELAS was reported in San Francisco, Newman, San Bernardino, Santa Cruz, Shasta, Fresno, El Monte, Chico, Sacramento, Brownsville, Biggs, Needles, and Lakeport. The disease was of a mild type.

PAROTIDITIS, OR MUMPS, was prevalent in Madera, Brownsville, and College City.

DIARRHŒA AND DYSENTERY were noticed with increased frequency in our reports. They were observed in Fresno, Newman, Santa Paula, Bakersfield, Shasta, Calico, Nevada City, Williams, Needles, Sausalito, Eureka, Los Angeles, San José, and San Francisco.

TYPHOID FEVER was noticed in reports from Sacramento, Lockeford, Santa Paula, Chico, Cloverdale, Nevada City, Pleasanton, Middletown, Los Angeles, Petaluma, Oakland, Redlands, San José, Santa Ana, Cottonwood, College City, Igo, and Davisville.

REMITTENT AND INTERMITTENT FEVERS are noticed in nearly all our reports. As they are incidental to the abating of the waters and the increase of temperature, their frequency may be expected as the summer advances.

CEREERO-SPINAL FEVER, which is a much more serious disease, was noticed in reports from San Francisco, Los Angeles, Oakland, Livermore, Fresno, Lincoln, Riverside, Santa Maria, Chico, and Sisson. In connection with these zymotic affections we cannot but regret that the example of Minnesota is not followed in this State. There the law requires that in the month of May, or oftener in each year, the Health Officer shall make a thorough sanitary inspection of the city, town, or village under his jurisdiction, and present a written report of such inspection at the next meeting of the Board of Health, and shall forward a copy of such report, as soon as rendered, to the State Board of Health. This wise provision of the law has been followed by the most salutary results. It gives the Health Officer a complete knowledge of the sanitary condition of the town, and in case of an outbreak of disease he is in a position to know its probable cause, and is thus quickly enabled to use the means necessary for its suppression or its extinction, to the saving of many lives and the great monetary interest of the community.

PACIFIC COAST WEATHER.

The weather during April presents few marked features. The month has been one with few rainy days and no severe storms. Rain fell in Oregon and Washington on the 2d, 4th, 5th, 6th, 7th, 11th, 17th, and 18th; in Northern California on the 6th, 17th, and 18th; and in Southern California on the 18th. Local showers also fell in Northern California

on the 29th and 30th. The mean monthly temperatures at reporting stations have been slightly higher than usual, the largest departures from normal temperatures occurring in Southern California. The rainfall for the month has been deficient in all the Pacific States, being least in Southern California, and greatest in the northern quarter of the same State.

MAY, 1890.

Mortality reports received from one hundred and three cities and towns throughout the State, with an estimated population of seven hundred and sixty-six thousand six hundred and twenty-five, give the number of decedents as one thousand and twenty-two, a monthly percentage of 1.33 per thousand, or at the rate of 15.96 per annum, which is a slight increase over last month. The principal causes of death are to be found among the diseases of the lungs and heart.

CONSUMPTION caused one hundred and sixty-four deaths.

PNEUMONIA is credited with ninety-seven deaths, seventy of which occurred in San Francisco, the remaining twenty-seven being scattered throughout the State, indicating a marked diminution in the frequency of the disease.

BRONCHITIS gives a record of forty-four deaths. Of these, thirty-three occurred in San Francisco, the remainder in single cases elsewhere.

CONGESTION OF THE LUNGS was fatal in nine instances.

WHOOPIING-COUGH was the cause of four deaths.

DIPHTHERIA AND CROUP, collectively, were fatal in twenty-seven instances. Of these, sixteen were from diphtheria and eleven from croup. Of the former, thirteen occurred in San Francisco, one each in Stockton, Los Angeles, and Gridley. Croup caused eight deaths in San Francisco, two in Knights Ferry, and one in Los Angeles.

CHOLERA INFANTUM is credited with six deaths in May. One each in Bakersfield, Salinas, San Francisco, San José, Needles, and Fresno. This is an increase of four over last report.

DIARRHŒA AND DYSENTERY were fatal in sixteen cases, which is more than double the mortality of the preceding month, and indicates an increased frequency of occurrences of these diseases.

SCARLET FEVER was fatal in four cases—three in San Francisco and one in Woodland.

MEASLES caused thirteen deaths in San Francisco and one in Los Angeles.

TYPHO-MALARIAL FEVER was fatal in but one instance.

TYPHOID FEVER caused sixteen deaths, which is a decreased mortality from the previous month.

REMITTENT FEVER is credited with but two deaths.

CEREBRO-SPINAL FEVER caused seven deaths, which is a decrease of over one half from the previous report. Three of these deaths occurred in San Francisco, and one each in Stockton, San José, Los Angeles, and Lakeport.

ERYSIPELAS caused two deaths in San Francisco and one in Sacramento.

CANCER was fatal to forty-four persons.

HEART DISEASE caused eighty-four deaths.

ALCOHOLISM caused eight deaths.

No deaths were reported in Visalia, Truckee, Rocklin, Roseville, Oakdale, Newman, Nevada City, Madera, Long Beach, Jolon, Igo, Forest Hill, Elsinore, Downieville, Dixon, Colfax, Colton, or Biggs.

PREVAILING DISEASES.

Reports of sickness received from ninety-two localities give very favorable records regarding the general health of the public. We find in many places that measles prevails to a large extent, and that whooping-cough is almost epidemic in one or two localities. The weather for the month of May being quite favorable to those suffering from diseases of the respiratory organs, a marked decrease was noted in the prevalence of pneumonia, bronchitis, and influenza, while on the other hand an increased prevalence was noted in the frequency of bowel and stomach disorders.

CHOLERA INFANTUM was observed in Fresno, Ione, Bakersfield, Cottonwood, Salinas, and Needles.

DIARRHŒA AND DYSENTERY were also mentioned in reports from Cloverdale, Anaheim, El Monte, Shasta, Fresno, Downey, Riverside, Bakersfield, Ione, Gridley, Redding, Needles, Livermore, Etna Mills, Colusa, Rio Vista, Alameda, Antioch, Los Angeles, and Santa Barbara.

MEASLES was noticed during the month in Sacramento, Mariposa, Antioch, El Monte, Watsonville, Fresno, Dixon, Jolon, Middletown, Azusa, Hollister, Eureka, Los Angeles, and San Francisco.

SCARLET FEVER.—Some sporadic cases appeared in Sacramento, El Monte, Fresno, Woodland, Biggs, Ontario, Lodi, Rio Vista, and San Francisco. The type thus far has been exceedingly mild, and in most cases was confined to its place of development.

DIPHTHERIA AND CROUP were present in Mariposa, Live Oak, Anaheim, Stockton, Merced, Elk Grove, Eureka, Gridley, Williams, Redding, Rio Vista, Knights Ferry, Los Angeles, and San Francisco. The cases were sporadic, without epidemic tendency.

WHOOPIING-COUGH prevailed to some extent in Napa, El Monte, Merced, Cloverdale, Redding, Azusa, Hanford, Pomona, and San Francisco.

ERYSIPELAS is noted in reports from Sacramento, San Francisco, Fresno, Downey, Calico, Eureka, Redding, Susanville, Shasta, and College City.

TYPHOID FEVER has prevailed to a limited extent without any apparent tendency to epidemicity, and depending in most cases upon local causes. It was noted in San Francisco, Chico, Etna Mills, Sacramento, El Monte, Haywards, Pomona, Santa Ana, Santa Paula, Sisson, Merced, Napa, Nevada City, Salinas, and Pleasanton.

TYPHO-MALARIAL FEVER was reported in Shasta, Fresno, College City, Igo, Cloverdale, Cottonwood, Anaheim, and Rio Vista.

REMITTENT FEVER was observed with some frequency in Sacramento, El Monte, Fresno, Ione, Riverside, Bakersfield, Merced, Newcastle, Redding, Needles, Lodi, Knights Ferry, and San José.

CEREBRAL FEVER was noted in Lakeport, Riverside, Stockton, Lodi, San José, San Francisco, and Nevada City.

PNEUMONIA is mentioned in but few reports for May. Sporadic cases are reported in Fresno, Lakeport, Bakersfield, Etna Mills, Nevada City, Susanville, St. Helena, Alameda, Calico, College City, Pleasanton, Cottonwood, Eureka, Folsom, Healdsburg, Shasta, Knights Ferry, Los Angeles, Martinez, Placerville, Sacramento, Santa Rosa, Watsonville, Yreka, San José, Santa Ana, and San Francisco, where the disease was quite prevalent.

BRONCHITIS appears to be more prevalent than pneumonia, in the form of bronchial catarrh rather than acute bronchitis. Many cases were observed in Sacramento, Galt, Anaheim, Alameda, Downey, Fresno, Colfax, Middletown, Igo, Hollister, Martinez, Santa Paula, Bakersfield, Ione, Williams, Redding, Lodi, Etna Mills, Santa Maria, Ontario, Pasadena, San José, Placerville, Grass Valley, San Francisco, and Pleasanton.

VARICELLA, OR CHICKENPOX, is reported in few places.

SMALLPOX.—No cases of this disease were reported in California. Dr. S. S. Herrick, the Medical Inspector appointed by this Board to investigate the towns near the southern border of the State, reported to be the seat of smallpox, finds upon personal examination that the account received by the State Board of Health was very much exaggerated. He discovered no cases along the route of the Southern Pacific Railway, but found that there was smallpox in Las Cruces and other contiguous villages in New Mexico, but none so close to railroad travel as to seriously threaten us at present. Every precaution has been taken to prevent the spread of the disease in California, and it is to be hoped our efforts will be successful in this respect.

We are glad to be able to report the decision of the Supreme Court upholding the constitutionality of the law making compulsory the vaccination of all children attending the public schools of the State. The following is a synopsis of the case tried and the Court's decision:

Action was brought in the Superior Court of Santa Cruz County by D. K. Abeel against D. C. Clark, Principal of the High School of that county, to compel the admission to the school of his two sons, D. K. and James, who were refused admission to the school because of non-compliance with the Vaccination Act, and the Court gave judgment in favor of the Principal. Abeel took an appeal to the Supreme Court, which tribunal has affirmed the decision of the Court below. The Court says:

"The Act referred to is designed to prevent the dissemination of what, notwithstanding what medical science has done to reduce its severity, still remains a highly contagious and much dreaded disease. While vaccination may not be the best and safest preventive possible, experience and observation, the test of the value of such discoveries, dating from 1796, when Jenner disclosed it to the world, have proved it to be the best method known to medical science to lessen the liability to infection with the disease.

"This being so, it seems highly proper that the spread of smallpox through the public schools should be prevented or lessened by vaccination, thus affording protection both to the scholars and the community.

"Vaccination, then, being the most effective method known of preventing the spread of the disease referred to, it was for the Legislature to determine whether the scholars of the public schools be subjected to it, and we think it was justified in deeming it a necessary and salutary burden to impose upon that general class. The remarks of Judge Cooley, in his work on Constitutional Limitations, page 167, are applicable here, where he says: 'What is for the public good, and what are public purposes, and what does properly constitute a public burden, are questions which the Legislature must decide upon its own judgment, and in respect to which it is invested with a large discretion which cannot be controlled by the Courts, except, perhaps, when its action is clearly evasive, and where under pretense of lawful authority it has assumed to exercise one that is unlawful.'"

This decision will be of invaluable benefit to the State in a sanitary point of view, compelling, as it does, Boards of Education and School Superintendents to do their duty in the premises, and give children that protection from disease to which they are entitled by the State. If the rising generation is generally and carefully vaccinated with pure virus, in the hands of competent operators, we may very soon bid defiance to any extensive invasion of smallpox. To obtain this result, however, vaccination must not be intrusted to any incompetent to determine which is a true and which a spurious vaccine vesicle. Upon this depends the value of the operation, the true vesicle being as infallibly protective as the spurious as surely fails in any protecting qualities. We must, therefore, urge upon Boards of Education and School Superintendents to discountenance, as far as possible, the vaccination of those committed to their care by any but educated physicians. The safety of the children is too serious a matter to be left in doubt, and doubt there will be where incompetence to distinguish success from failure prevails.

PACIFIC COAST WEATHER.

The weather during May has been generally favorable to the growing crops in the Pacific Coast States, the light rains at the end of the month in Oregon and Washington being particularly beneficial.

Rain fell in Northern California on the 6th, 7th, 8th, 9th, 10th, and 11th; in Southern California on the 8th, 9th, 10th, 26th, and 27th; in Oregon on the 6th, 7th, 8th, 9th, 10th, 19th, 29th, and 31st; and in Washington on the 8th, 9th, 10th, 11th, 19th, 29th, and 31st. In Central California and Southern California the rains were light and local.

The temperature has, during the greater part of the month, been higher than the normal May temperature, short periods of cool weather occurring, however, from the 6th to the 12th, and from the 26th to the 31st.

JUNE, 1890.

Mortality reports received from one hundred and nine cities and towns throughout the State, with an estimated population of eight hundred and twenty-four thousand three hundred and fifty, give the number of decedents as one thousand and sixty-six, which is a monthly percentage of 1.29 per thousand, or an annual mortality at the rate of 15.48, which is a decrease from the percentage in May. Until the official result of the late census is published, we have to accept the estimated population as furnished by our correspondents, and which we know now to be in many instances much exaggerated. Our actual death rate is, therefore, uncertain until we can get the correct, or nearly correct, number of the population affected. There has been very little zymotic disease reported as particularly fatal, except cerebral fever and cholera infantum, and these in limited number.

CONSUMPTION caused the largest mortality, one hundred and fifty-four deaths being reported from it.

PNEUMONIA was fatal in sixty-eight instances, which is a decided decrease from former report.

BRONCHITIS caused thirty deaths.

CONGESTION OF THE LUNGS, twelve.

WHOOPING-COUGH was fatal in three instances.

DIPHTHERIA AND CROUP, collectively, were reported as causing thirty-five deaths, which indicates a very much lessened prevalence of the disease. Twenty-six were from diphtheria, and nine from croup; of the former, seventeen were credited to San Francisco, one occurred in Santa Ana, and one each in Sacramento, San Bernardino, Oakland, and Martinez, and two each in Los Angeles and Oakdale; and of the latter, one death occurred in Vallejo, San José, Woodland, and Long Beach, and five in San Francisco.

CHOLERA INFANTUM is credited with fifty-one deaths in June, which is a marked increase over the mortality recorded from this disease last month.

DIARRHŒA AND DYSENTERY caused nineteen deaths.

SCARLET FEVER was fatal in but two instances, both in Oakland.

MEASLES caused but five deaths, two occurring in Los Angeles.

TYPHO-MALARIAL FEVER was fatal in five instances.

TYPHOID FEVER caused eighteen deaths.

REMITTENT FEVER is credited with two deaths.

CEREBRO-SPINAL FEVER caused twenty-one deaths, which is an increased mortality. Two each occurred in Stockton, Hanford, and Los Angeles, and one each in Alameda, Anaheim, Benicia, Berkeley, Davisville, Jackson, Martinez, Mendocino, Napa, Oakland, Suisun, and Visalia; three in San Francisco.

ERYSIPELAS was fatal in one instance.

CANCER is credited with twenty-seven deaths.

HEART DISEASE caused seventy-nine deaths.

ALCOHOLISM was fatal to five persons.

DEATHS FROM CAUSES not classified in this abstract, numbered four hundred and fifty.

PREVAILING DISEASES.

Reports received from eighty-four localities in different parts of the State indicate an improved condition of the public health. Respiratory diseases are no longer mentioned as prevailing to any extent, except bronchitis, which is noticed with some frequency in our reports of sickness. Disorders of the bowels were prevailing to some extent, and some few cases of cholera morbus were noticed. This disease was no doubt induced in many cases by eating of unripe or unsound fruit or vegetables. Zymotic diseases, such as measles, scarlet fever, diphtheria, etc., were not prevalent anywhere, and where present were in a mild form, without any tendency to spread or become epidemic.

CHOLERA INFANTUM.—Some cases of this disease were observed in Bakersfield, Lodi, Anderson, Gridley, Needles, Napa, Chico, Santa Paula, Sacramento, Oakdale, Oakland, Pomona, San José, Tulare, El Monte, Salinas, Martinez, and San Francisco.

DIARRHŒA AND DYSENTERY are mentioned as in sporadic form in Bakersfield, Mojave, Newcastle, Knights Ferry, Downey, Brownsville, Lockeford, Middletown, Etna Mills, Chico, Rocklin, Fresno, Pomona, Livermore, El Monte, Merced, Newman, Calico, Rio Vista, Sacramento, St. Helena, Colton, Pleasanton, Oakdale, and Mariposa.

CHOLERA MORBUS was present in a few instances in Downey, Gridley, Needles, Middletown, Fresno, Elk Grove, Ione, Chico, Livermore, and El Monte.

MEASLES were reported in Sausalito, Truckee, Cottonwood, Forest Hill, Alturas, Los Angeles, El Monte, Jolon, Watsonville, Sacramento, Cloverdale, and San Francisco.

SCARLET FEVER.—Isolated cases were observed in Sacramento, Rocklin, Sausalito, Ontario, Oakdale, Oakland, and El Monte.

DIPHTHERIA AND CROUP.—Few cases were reported in Sacramento, Truckee, Rocklin, Oakdale, Elk Grove, Santa Ana, Los Angeles, Long Beach, Oakland, San José, Vallejo, College City, Eureka, San Bernardino, Anaheim, Cloverdale, Martinez, and San Francisco.

WHOOPING-COUGH was noticed in Bakersfield, Sausalito, Lodi, Azusa, Colton, Napa, Oakdale, Pomona, Redding, Salinas, and Millville.

ERYSIPELAS.—Some sporadic cases of this disease were observed in Sacramento, Downey, Bakersfield, Brownsville, Lodi, Chico, Calico, Oakdale, St. Helena, College City, Redding, Newman, Eureka, Anaheim, and Shasta.

TYPHOID FEVER is mentioned in a limited number of reports this month, the cases being all sporadic. It was noticed in Sacramento, Rocklin, Newcastle, Santa Paula, Rio Vista, Livermore, Santa Ana, Los Angeles, Oakland, San Diego, El Monte, San José, Santa Barbara, and San Francisco. From this time onwards we may look for an increase in this preventable disease, as it seems impossible to educate the public up to the necessity of keeping their premises free from accumulating and decomposing filth, the air they breathe, the food they eat, and the water they drink thereby becoming contaminated and dangerous to health. Of all the sources from which typhoid fever emanates, polluted water is the most frequent. Every person drinking well water should personally see that all sources of defilement are removed from the vicinity of the well, as when the surface water evaporates and the ground water lowers, the well hole acts as a reservoir for the drainage of all fluids in its vicinity. Thus the well water becomes as dangerous to drink as any other poisonous fluid; hence we account for the increase of typhoid fever in the later months of summer, much of which is avoidable by care and assiduity in cleaning up soiled premises and removing all garbage and other filth.

TYPHO-MALARIAL FEVER, which is doubtfully distinguished from typhoid, was noticed in Igo, Knights Ferry, Chico, Pleasanton, Ione, Azusa, Los Angeles, Fresno, College City, and Nevada City.

REMITTENT FEVER was observed in Bakersfield, Igo, Knights Ferry, Brownsville, Lodi, Lockeford, Redding, Ione, Anderson, Middletown, Cottonwood, Chico, Fresno, Rio Vista, Livermore, Tulare City, and Sacramento.

CEREBRAL Fever was noticed in Suisun, Pleasanton, Chico, Berkeley, Los Angeles, Hanford, Oakland, Mendocino, Stockton, Visalia, Anaheim, and Jackson, where Dr. E. B. Robertson noticed it was accompanied by the black spots which are so characteristic of the malignant type of the disease.

PNEUMONIA.—Isolated cases of this disease were observed in Alameda, Anaheim, Chico, Eureka, Los Angeles, Oakland, Nevada City, Sacramento, Salinas, San Bernardino, Shasta, Vallejo, Napa, Etna Mills, Angels Camp, and Elsinore. In San Francisco it was quite prevalent.

BRONCHITIS, in a mild form, was quite general. It is noticed in many reports: Bakersfield, Biggs, Igo, Sausalito, Downey, Downieville, Brownsville, Lodi, Truckee, Lockeford, Sacramento, St. Helena, Oakdale, Grass Valley, Oakland, Fresno, Merced, Mojave, Ione, Benicia, Tehachapi, Salinas, and Eureka.

CHOLERA ASIATIC.—Advices have been received from the East that cholera is increasing in Spain, and as it commenced in the same province where in 1885 it carried off seventy-two thousand of its inhabitants, it is not improbable that the same lack of sanitary care will permit it to spread throughout Spain, and thence reach America through the Mediterranean or eastern imports. The disease is supposed to have originated in Valencia from opening the graves of some of the victims of the disease in 1885, and is of a virulent type. As it has been proved again and again that cholera cannot prevail where perfect cleanliness is observed, it would be a matter of simple prudence to prepare to defeat any attempted inroad of this disease into California by a general clean up of our cities, towns, and villages. Once the disease appears, this measure would be too late, and we would be left to mourn our dying and our dead, the result of our own apathy and willful neglect of a manifest duty. We cannot be sure that cholera will not come to America; we hope it will not. But with a means of prevention so easily applied, we would be criminal to neglect the warning thus timely given.

FINANCIAL STATEMENT.

STATEMENT OF THE EXPENSES OF THE STATE BOARD OF HEALTH FOR THE FORTIETH FISCAL YEAR, ENDING JUNE 30, 1889.

1888.			
Appropriation			\$1,250 00
Additional appropriation			500 00
July 2—Annals Hygiene		\$14 00	
Expressage		8 00	
26—Traveling expenses of Dr. C. A. Ruggles		10 40	
Traveling expenses of Dr. R. B. Cole		18 00	
Traveling expenses of Dr. James Simpson		15 00	
Traveling expenses of Dr. H. S. Orme		50 75	
Traveling expenses of Dr. J. M. Briceland		24 50	
30—Postage stamps		5 00	
Office rent		25 00	
Aug. 6—Stamps		1 00	
18—Express charges		1 65	
Engraving seal		8 00	
Traveling expenses of Drs. Tyrrell and Cluness		122 10	
28—Traveling expenses of Drs. Tyrrell and Cluness		36 60	
30—Traveling expenses of Dr. C. A. Ruggles		87 96	
31—Stamps		5 00	
Fountain pen		2 50	
Rent		25 00	
Sept. 3—Stamps		1 00	
Expressage		1 60	
Traveling expenses to Los Angeles and San Diego		95 00	
Telegraphing		4 47	
Traveling expenses of Dr. C. A. Ruggles		11 00	
14—Traveling expenses of Dr. J. M. Briceland		40 00	
Traveling expenses of Dr. Cluness		13 00	
Traveling expenses of Dr. G. G. Tyrrell		13 00	
Traveling expenses of Dr. H. S. Orme		62 00	
30—Stamps		5 00	
Office rent		25 00	
Post Office rent		2 00	
Oct. 11—Stamps		5 00	
13—Traveling expenses of Dr. C. A. Ruggles		9 40	
Traveling expenses of Dr. J. M. Briceland		25 00	
Traveling expenses of Dr. H. S. Orme		57 00	
Traveling expenses of Dr. R. B. Cole		12 50	
30—Stamps		5 00	
Office rent		25 00	
Telegraphing		3 40	
Nov. 8—Stamps		10 00	
Sanitary News		3 00	
Disinfectants		10 40	
Expressage		5 80	
21—Telegraphing		6 70	
Traveling expenses of Dr. C. A. Ruggles		11 20	
30—Office rent		25 00	
Dec. 3—Traveling expenses of Dr. G. G. Tyrrell		24 00	
11—Stamps		61 50	
18—Traveling expenses of Dr. G. G. Tyrrell		14 00	
29—Stamps		11 00	
Post Office rent		2 00	
Expressage		3 20	
31—Telegraphing		3 05	
Office rent		25 00	
1889.			
Jan. 5—Traveling expenses of Dr. H. S. Orme		50 00	
Traveling expenses of Dr. J. M. Briceland		22 50	
Traveling expenses of Dr. James Simpson		15 00	
Traveling expenses of Dr. R. B. Cole		15 00	
Traveling expenses of Dr. C. A. Ruggles		9 40	

FINANCIAL STATEMENT—Continued.

1889.			
	9—Typewriting	\$2 00	
	24—Stamps	25 00	
	30—Office rent	25 00	
Feb.	20—Traveling expenses of Dr. G. G. Tyrrell	18 80	
	28—Office rent	25 00	
Mar.	20—Sanitarian	4 60	
	28—Traveling expenses of Dr. G. G. Tyrrell	24 30	
	Postage stamps	5 00	
	Postal cards	10 00	
	American Public Health Association	5 00	
	30—Post Office rent	2 00	
	Office rent	25 00	
April 15—	Expressage	8 75	
	Traveling expenses of Dr. C. A. Ruggles	26 80	
	Traveling expenses of Dr. J. M. Briceland	50 60	
	Traveling expenses of Dr. H. S. Orme	60 25	
	Traveling expenses of Dr. G. G. Tyrrell	15 00	
	Traveling expenses of Dr. W. R. Cluness	15 00	
	30—Telegraphing	65	
	Office rent	25 00	
	Stamps	10 00	
	Photographs of leprosy	14 00	
May 17—	Stamps	20 00	
	31—Office rent	25 00	
	Stamps	5 00	
June 18—	Stamps	20 00	
	30—Post Office rent	2 00	
	Office rent	25 00	
	Total	\$1,685 52	
	Balance	64 68	
	Total	\$1,750 00	\$1,750 00

STATEMENT OF THE EXPENSES OF THE STATE BOARD OF HEALTH FOR THE FORTY-FIRST FISCAL YEAR, ENDING JUNE 30, 1890.

1889.			
Appropriation			\$1,500 00
July 19—	Traveling expenses of Dr. J. M. Briceland	\$23 00	
	Traveling expenses of Dr. C. A. Ruggles	13 80	
	Traveling expenses of Dr. H. S. Orme	46 75	
	Annals Hygiene	14 10	
	Expressage	13 75	
	22—Stamps	20 00	
	27—Expressage	16 90	
	Telegraphing	1 80	
	30—Office rent	25 00	
Aug. 3—	Expressage	27 70	
	Postal cards	10 00	
	30—Office rent	25 00	
Sept. 11—	Traveling expenses of Dr. G. G. Tyrrell	8 50	
	Expressage	70	
	Stamps	10 00	
	16—Traveling expenses of Dr. C. A. Ruggles	182 10	
	30—Office rent	25 00	
Oct. 11—	Traveling expenses of Dr. J. M. Briceland	27 00	
	Traveling expenses of Dr. H. S. Orme	58 00	
	Traveling expenses of Dr. C. A. Ruggles	15 40	
	15—Postage stamps	15 00	
	Expressage	1 00	
	Telegraphing	1 65	
	30—Office rent	25 00	
Nov. 30—	Post Office rent	2 00	
	Telegraphing	2 00	
	Office rent	25 00	
Dec. 17—	Stationery	5 40	
	Expressage	2 70	
	Stamps	10 00	
	30—Office rent	25 00	

FINANCIAL STATEMENT—Continued.

1890.			
Jan.	11—Traveling expenses of Dr. C. A. Ruggles	\$14 90	
	Traveling expenses of Dr. G. G. Tyrrell	15 00	
	Traveling expenses of Dr. H. S. Orme	64 00	
	18—American Public Health Association	5 00	
	Telegraphing	5 65	
	30—Office rent	25 00	
Feb.	6—Sanitary News	2 00	
	Sanitary Record	2 50	
	Sanitarian	4 00	
	21—Stamps	25 00	
	Telegraphing	60	
	Office rent	25 00	
Mar.	1—Proceedings of the Conference of Boards of Health	1 25	
	8—Expressage	2 60	
	26—Stamps	12 00	
	29—Huntington & Hopkins	3 60	
	Post Office rent	2 00	
	31—Stationery	4 65	
	Office rent	25 00	
April	3—American Public Health Association	1 40	
	8—Stamps	15 00	
	12—Traveling expenses of Dr. J. M. Briceland	23 50	
	Traveling expenses of Dr. C. A. Ruggles	15 40	
	Traveling expenses of Dr. James Simpson	15 00	
	Traveling expenses of Dr. R. B. Cole	15 00	
	Traveling expenses of Dr. G. G. Tyrrell	15 00	
	30—Telegraphing	3 76	
	Office rent	25 00	
May	3—Expressage	1 15	
	Stationery and stamps	13 75	
	Stamps	10 00	
	7—Traveling expenses of Dr. G. G. Tyrrell	10 00	
	31—Office rent	25 00	
	Telegraphing	7 35	
June	9—Postal cards	15 00	
	10—Expressage	1 35	
	11—Stationery	4 80	
	20—Stamps	15 00	
	Traveling expenses of Dr. G. G. Tyrrell	25 60	
	Telegraphing	2 90	
	30—Post Office rent	2 00	
	Office rent	25 00	
Total		\$1,098 86	
Balance		403 14	
Total		\$1,500 00	\$1,500 00

EXPENSES OF THE STATE BOARD OF HEALTH ON ACCOUNT OF CONTAGIOUS AND INFECTIOUS DISEASES, FOR FORTIETH AND FORTY-FIRST FISCAL YEARS.

1888.			
Balance appropriation			\$7,498 90
Oct.	30—Traveling expenses Dr. S. S. Herrick	\$211 45	
Nov.	6—Salary Dr. S. S. Herrick, one month, six days	300 00	
Total		\$511 45	
Balance		6,982 45	
1890.			7,498 90
Balance			\$6,982 45
April	30—Expenses of C. A. Ruggles, delegate to Conference of Boards of Health	\$500 00	
May	25—Traveling expenses	250 00	
	Salary Dr. S. S. Herrick, one month	250 00	
Total		\$1,000 00	
Balance		5,982 45	
			6,982 45

NAMES AND RESIDENCES OF HEALTH OFFICERS AND CORRESPONDENTS

Of the State Board of Health for the years 1889 and 1890.

DR. J. R. DORRHO	Angels Camp, Calaveras County.
DR. O. P. PAULDING	Anderson, Shasta County.
DR. R. F. ROONEY and A. S. WALDO, H. O.	Auburn, Placer County.
DR. J. H. MILLER	Azusa, Los Angeles County.
DR. J. T. McLANE	Alameda, Alameda County.
DRS. ALBERT FOUCH and C. P. PAULDING	Anderson, Shasta County.
DR. J. H. BULLARD	Anaheim, Los Angeles County.
DR. FRANK RATTAN	Antioch, Contra Costa County.
DR. J. M. FORREST	Alturas, Modoc County.
DR. C. A. ROGERS	Bakersfield, Kern County.
DR. EDWARD GRAY	Benicia, Solano County.
DR. F. H. PAYNE	Berkeley, Alameda County.
DRS. O. C. HAWKINS and W. R. CLEVELAND	Biggs, Butte County.
DR. DAVID WALKER	Bodie, Mono County.
DR. L. C. CROSSMAN	Brownsville, Sierra County.
DR. A. H. RHEA	Calico, San Bernardino County.
DR. W. KING	Chico, Butte County.
DR. M. F. PRICE	Colton, San Bernardino County.
DR. C. A. GIBBONS	College City, Colusa County.
DR. R. A. GRAY	Colusa, Colusa County.
DR. J. O. SMITH	Cottonwood, Shasta County.
DR. J. GREGORY	Castroville, Monterey County.
DRS. W. A. PATTERSON and B. WOODBRIDGE	Cedarville, Modoc County.
DR. R. S. MARKELL	Cloverdale, Sonoma County.
DR. H. N. MINER	Colfax, Placer County.
DR. Q. J. ROWLEY	Downey, Los Angeles County.
DRS. A. TRAFTON and G. H. EVANS	Dixon, Solano County.
DR. ALEMEY JUMP	Downieville, Sierra County.
DR. W. E. BATES	Davisville, Yolo County.
DR. E. W. BATHURST	Etna Mills, Siskiyou County.
DR. F. P. CAVE	El Monte, Los Angeles County.
DR. J. A. MCKEE	Elk Grove, Sacramento County.
DR. S. B. FOSTER	Eureka, Humboldt County.
DRS. T. S. ELLIS and S. H. WASHBURN	Elsinore, San Diego County.
DR. PAUL REUDY	Forest Hill, Placer County.
DR. S. J. REID	Fort Bragg, Colusa County.
DRS. G. M. KOBER, U. S. A., and RAYMOND	Fort Bidwell, Modoc County.
DR. F. BATES, H. O.	Folsom, Sacramento County.
DR. T. M. HAYDEN	Fresno, Fresno County.
DR. M. M. ROWLEY	Fall River, Shasta County.
DR. A. MONTAGUE	Galt, Sacramento County.
DR. W. C. JONES	Grass Valley, Nevada County.
DR. C. A. E. HERTEL	Gonzales, Monterey County.
DRS. J. R. TODD and J. HARRIS	Gridley, Butte County.
DR. W. S. HICKMAN	Georgetown, El Dorado County.
DRS. J. G. COOPER and G. E. ALEXANDER	Haywards, Alameda County.
DR. H. V. ARMISTEAD	Hills Ferry, Stanislaus County.
DR. J. A. DAVIDSON	Hanford, Tulare County.
DR. N. B. COFFMAN	Healdsburg, Sonoma County.
DR. J. H. TEBBETTS	Hollister, San Benito County.
DR. C. F. GRANT	Hopland, Lake County.
DR. H. SCHAFFER	Igo, Shasta County.
DR. A. L. ADAMS	Ione, Amador County.
DR. J. N. M. MCGOWAN	Jolon, Monterey County.
DR. E. B. ROBERTSON	Jackson, Amador County.
DR. J. H. LOWE	Knights Ferry, Stanislaus County.
DR. J. D. DAVIDSON	Kingsburg, Fresno County.
DRS. W. S. TAYLOR and W. E. KEYES	Livermore, Alameda County.
DR. G. MACGOWAN	Los Angeles, Los Angeles County.
DR. J. FLINT and A. C. FLEMMING, H. O.	Lincoln, Placer County.

DRS. L. CARPENTER and S. R. MATHER	Lakeport, Lake County.
DR. L. M. LOVELACE	Lemoore, Tulare County.
DRS. F. W. COLMAN and E. A. BURCHARD	Lodi, San Joaquin County.
DR. J. W. WOOD	Long Beach, Los Angeles County.
R. S. BURGETT, J. P.	Little Stoney, Colusa County.
DR. F. W. KNOWLES	Los Gatos, Santa Clara County.
DR. E. N. FOOTE	Lockeford, San Joaquin County.
DR. W. A. CRAIG	Lower Lake, Lake County.
DR. J. B. TENNANT	Martinez, Contra Costa County.
DR. DAVID POWELL	Marysville, Yuba County.
DR. W. MILLIKEN	Mendocino, Mendocino County.
DR. E. S. O'BRIEN	Merced, Merced County.
DR. E. V. JACOBS	Meridian, Sutter County.
DR. R. E. HARTLEY	Middletown, Lake County.
DR. T. J. STEWART	Monrovia, Los Angeles County.
DR. J. N. CRABE	Millville, Shasta County.
DRS. J. H. OSLER and W. J. WILHITE	Modesto, Stanislaus County.
DR. J. T. SURBAUGH	Madera, Fresno County.
DR. W. J. KEARNEY	Mariposa, Mariposa County.
DRS. W. E. ROBE and J. R. SUTTON	Maxwell, Colusa County.
DRS. J. P. E. HINTZ and W. FAULKNER	Monterey, Monterey County.
DR. L. F. JOHNSON	National City, San Diego County.
DR. M. B. POND	Napa, Napa County.
DRS. C. D. BOBO and F. R. WAGGONER	Nevada City, Nevada County.
DR. M. SCHNABEL	Newcastle, Placer County.
DR. G. S. FARLEY	North San Juan, Nevada County.
DRS. F. H. HUTCHINS and J. MANSON	North Bloomfield, Nevada County.
DR. J. P. BOOTH	Needles, San Bernardino County.
DR. CALLAGHAN	Nicolaus, Sutter County.
DR. D. D. CROWLEY	Oakland, Alameda County.
DR. W. THURSTON	Orland, Colusa County.
DR. J. H. M. KARSNER	Oroville, Butte County.
DR. W. E. SCOTT	Ontario, San Bernardino County.
DRS. F. W. STRATTON and R. ENDICOTT	Oakdale, Stanislaus County.
DR. L. H. PATTY	Petaluma, Sonoma County.
DRS. W. L. McALLISTER and H. SHERK	Pasadena, Los Angeles County.
DRS. J. Q. WRENN and H. W. WORTHEN	Placerville, El Dorado County.
DR. T. H. MATHER	Point Arena, Mendocino County.
DRS. A. C. SMITH and W. A. NORMAN	Plymouth, Amador County.
DR. O. S. TRIMMER	Pacific Grove, Monterey County.
DR. F. GARCELON	Pomona, Los Angeles County.
DR. W. COPE	Pleasanton, Alameda County.
DR. A. M. STAFFORD	Rocklin, Placer County.
DR. JOHN FIFE	Red Bluff, Tehama County.
DR. S. C. BROWN	Rio Vista, Solano County.
DRS. C. C. SHERMAN and W. B. SAWYER	Riverside, San Bernardino County.
DR. W. BOLTON	Roseville, Placer County.
DR. F. P. MITCHELL	Redding, Shasta County.
DR. C. A. SANBORN	Redlands, San Bernardino County.
DR. H. L. NICHOLS	Sacramento, Sacramento County.
DRS. D. E. BARGER and J. W. KEENEY	San Francisco, San Francisco County.
DR. D. GOCHENAUER	San Diego, San Diego County.
DR. E. C. RHODES	Sisson, Shasta County.
DR. R. F. WINCHESTER	Santa Barbara, Santa Barbara County.
DR. E. H. GOULD	Sonora, Tuolumne County.
DR. R. W. HILL	San Pedro, Los Angeles County.
DR. C. L. ANDERSON	Santa Cruz, Santa Cruz County.
DRS. J. CURNOW and W. SIMPSON	San José, Santa Clara County.
DRS. R. P. SMITH, JR., and H. C. CROWDER	Santa Rosa, Sonoma County.
DR. W. THORNBURG	Santa Maria, Santa Barbara County.
DR. J. R. TULLY	Sierra City, Sierra County.
DR. H. O. BRINK	Soquel, Santa Cruz County.
DR. W. J. G. DAWSON	St. Helena, Napa County.
DR. A. SAKÉ	Santa Clara, Santa Clara County.
DR. J. W. REYNOLDS	Suisun, Solano County.
DR. J. M. BRICKLAND	Shasta, Shasta County.
DR. T. R. GOODSPEED	San Mateo, San Mateo County.
DRS. A. MILLIKEN and J. B. SPALDING	Susanville, Lassen County.
DR. H. J. CRUMPTON	Sausalito, Marin County.
DRS. J. M. LACY and J. G. BAILEY	Santa Ana, Santa Barbara County.
DR. M. F. PATTEN	Santa Paula, Ventura County.
DR. E. C. FOLSOM	Santa Monica, Los Angeles County.
DR. E. E. BROWN	Selma, Fresno County.
DR. MAY GYDISON	Salinas City, Monterey County.
DRS. A. C. COLLINS and A. C. KEATING	San Bernardino, San Bernardino County.
DR. W. W. HAYES, F. O. ROBBINS, H. O.	San Luis Obispo, San Luis Obispo County.

DR. C. A. RUGGLES.....	Stockton, San Joaquin County.
DR. W. CURLESS.....	Truckee, Nevada County.
DR. A. SCHAFER.....	Tehachapi, Kern County.
DR. A. C. WINN.....	Tomales, Marin County.
DR. C. F. TAGGART.....	Tulare, Tulare County.
DR. H. P. TARTAR.....	Tehama, Tehama County.
DR. R. G. REYNOLDS.....	Upper Lake, Lake County.
DR. W. A. KING.....	Ukiah, Mendocino County.
DR. W. D. ANDERSON.....	Vallejo, Solano County.
DRS. T. W. PENDERGRASS and C. E. BERNHARD.....	Visalia, Tulare County.
DR. J. W. STITT.....	Vacaville, Solano County.
DR. A. J. COMSTOCK.....	Ventura, Ventura County.
G. E. NORMAN, H. O.....	Weaverville, Trinity County.
DR. W. D. RODGERS.....	Watsonville, Santa Cruz County.
DR. THOS. ROSS.....	Woodland, Yolo County.
DR. A. W. KIMBALL.....	Williams, Colusa County.
DR. L. MELTON.....	Wheatland, Yuba County.
DR. D. N. MASON.....	Willits, Mendocino County.
DR. L. P. TOOLEY.....	Willows, Colusa County.
DR. C. L. GREGORY and A. E. PAYNE, H. O.....	Yreka, Siskiyou County.

REPORT OF THE STATE BOARD OF HEALTH.

REPORT OF DEATHS

From June 30, 1888, to June 30, 1889, of those dying in the State of California.

DISEASES.	SEXES.			AGES.								NATIVITIES.						
	Total.....	Male.....	Female.....	Unascertained..	Under 1 year....	1 and under 5 years.....	5 and under 10 years.....	10 and under 20 years.....	20 and under 30 years.....	30 and under 40 years.....	40 and under 50 years.....	50 and under 60 years.....	60 and under 100 years.....	Unascertained..	Pacific States...	Atlantic States..	Foreign Coun-tries.....	Unascertained..
I.—ZYMOTIC, OR EPIDEMIC.																		
Cholera.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera morbus.....	17	13	8	1	4	2	0	0	0	0	1	1	4	6	6	4	4	3
Cholera infantum.....	233	114	116	3	185	87	0	0	0	0	0	0	0	232	232	15	31	10
Diarrhœa and dysentery.....	154	82	66	6	79	22	2	0	1	7	0	9	13	98	1	3	5	2
Smallpox.....	11	7	2	2	0	1	0	1	1	3	0	1	1	3	1	0	0	0
Measles.....	13	6	7	0	4	8	13	1	0	0	0	0	1	13	0	0	0	0
Scarlatina.....	38	24	13	1	5	15	13	2	0	0	0	1	1	35	2	2	1	0
Diphtheria.....	343	151	158	34	26	109	93	55	13	2	2	0	1	248	42	15	30	8
Croup.....	135	71	53	11	28	71	22	3	0	0	0	0	0	10	123	3	9	8
Influenza.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whooping-cough.....	59	26	32	1	45	12	0	1	0	0	0	0	0	56	1	1	2	0
Erysipelas.....	89	26	11	3	6	4	0	2	3	3	7	6	7	12	7	18	2	2
Fever—Typho-malarial.....	17	9	8	0	1	0	0	6	5	2	2	0	0	7	1	3	5	2
Typhoid.....	352	202	128	22	4	10	28	71	129	87	31	8	12	22	100	108	111	83
Remittent and intermittent.....	98	50	40	8	15	9	8	4	21	8	5	4	4	39	23	24	7	12
Cerebro-spinal.....	89	43	40	6	24	27	8	7	10	3	3	0	2	62	10	6	4	1
Syphilis.....	21	13	7	1	9	0	2	0	2	1	2	2	1	10	10	8	4	1
Alcoholism (direct or remote), in-cluding delirium tremens.....	98	69	19	10	0	0	0	0	12	15	20	14	17	7	31	46	14	14
II.—CONSTITUTIONAL DISEASES.																		
Hydrocephalus.....	15	6	8	1	10	1	0	1	0	1	0	1	0	11	1	1	1	2
Meningitis.....	253	126	114	13	80	85	22	14	15	9	8	4	2	14	184	20	38	11
Phthisis pulmonalis.....	1,727	1,023	550	164	10	10	25	125	429	367	293	168	104	334	461	744	198	64
Marasmus.....	864	198	158	18	282	24	8	4	2	5	6	7	13	18	284	11	45	0
Scurfula.....	2	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0

Rheumatism	34	21	12	1	0	0	0	0	4	4	7	6	4	7	2	6	8	19	1
Cancer	329	189	163	21	0	0	0	0	4	13	20	90	87	83	32	18	81	197	33
III.—LOCAL DISEASES.																			
Pneumonia	790	457	266	77	106	69	20	35	74	90	92	92	75	136	93	237	153	316	84
Pleurisy	20	15	5	0	0	1	0	1	1	7	5	5	2	2	1	4	4	11	1
Bronchitis	237	127	89	21	50	39	8	1	5	16	33	33	23	40	22	87	40	87	23
Other diseases of respiratory organs	100	51	44	5	20	10	1	4	11	10	4	4	9	17	14	36	24	32	8
Enteritis	156	79	72	5	97	15	3	9	7	2	5	5	5	5	8	112	15	15	14
Gastritis	63	22	25	6	12	4	1	3	5	2	8	8	9	5	4	13	11	20	4
Gastro-enteritis	42	21	17	4	16	5	0	0	5	2	2	2	3	5	4	21	3	9	9
Peritonitis (non-puerperal)	102	86	62	4	10	2	4	10	11	23	12	13	13	7	10	32	25	30	15
Diseases of the liver	173	89	65	9	4	0	1	3	18	25	42	42	37	30	13	16	51	91	15
Other diseases of stomach and bowels	124	72	41	11	27	13	8	5	7	17	19	19	10	16	7	48	33	23	15
Bright's disease and nephritis	230	145	75	10	1	6	0	16	23	38	53	53	46	38	10	19	36	106	19
Aneurism	26	21	2	3	0	0	0	0	1	5	3	3	11	2	4	1	6	15	4
Heart diseases	795	456	285	54	8	2	14	25	62	78	127	127	128	279	72	92	247	378	83
Convulsions	238	112	113	13	154	52	8	5	3	2	1	1	2	0	11	210	9	7	12
Other diseases of brain and nervous system	279	170	94	15	39	24	13	16	20	28	23	23	36	68	12	88	81	85	25
IV.—DEVELOPMENTAL DISEASES.																			
Puerperal diseases	73	0	73	0	0	0	0	2	33	28	2	2	1	2	5	18	21	21	13
Old age	205	91	98	16	0	0	0	0	0	0	0	0	0	205	0	12	69	96	29
V.—EXTERNAL CAUSES.																			
Suicide	126	106	18	2	0	0	0	7	40	27	19	19	9	16	8	17	42	52	15
Heat, death from—sunstroke	3	2	1	0	1	0	0	1	1	0	0	0	0	0	0	3	0	0	0
All other causes not classified	2,544	1,527	766	251	277	87	50	113	335	246	316	316	222	454	444	695	641	888	520
Stillbirths	447	130	76	241	241	241	241	241	241	241	241	241	241	241	241	447	241	241	241
Totals	11,204	6,149	3,991	1,064	1,650	776	349	567	1,333	1,126	1,253	987	1,599	1,147	4,071	2,391	3,607	1,135	1,135

REPORT OF DEATHS

From June 30, 1889, to December 31, 1889, of those dying in the State of California.

DISEASES.	SEXES.				AGES.								NATIVITIES.					
	Total	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—ZYMOTIC, OR EPIDEMIC.																		
Cholera	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
Cholera morbus	6	4	2	0	1	0	0	0	0	0	0	0	2	0	1	3	2	0
Cholera infantum	116	39	57	20	102	14	17	0	1	0	0	0	0	0	115	1	0	0
Diarrhoea and dysentery	86	55	29	2	41	0	1	1	5	0	4	6	8	0	68	7	15	0
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Measles	1	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0
Scarlatina	15	8	7	0	1	50	3	16	1	0	0	0	0	1	13	11	1	0
Diphtheria	127	64	60	3	11	50	41	1	5	2	0	0	0	2	104	11	10	2
Croup	62	32	22	8	14	84	10	1	0	0	0	0	0	3	55	2	1	0
Influenza	1	0	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0
Whooping-cough	28	14	14	0	18	7	0	1	1	1	1	0	0	0	25	1	2	0
Erysipelas	19	13	6	0	2	0	1	2	2	3	4	0	0	0	5	4	3	2
Fevers—Typho-malarial	11	7	3	1	0	0	1	2	4	2	1	1	0	0	4	6	1	0
Typhoid	228	131	93	4	4	9	13	47	79	36	21	4	7	8	83	52	87	6
Remittent and intermittent	30	12	18	0	2	8	3	3	6	4	1	3	3	0	11	6	9	4
Cerebro-spinal	48	20	28	2	17	7	3	9	8	0	0	0	0	5	35	9	2	2
Syphilis	16	9	6	1	12	1	0	0	0	0	3	0	0	0	13	1	2	0
Alcoholism (direct or remote), including delirium tremens	57	44	11	2	0	0	0	1	4	9	14	9	12	8	4	14	34	5
II.—CONSTITUTIONAL DISEASES.																		
Hydrocephalus	6	2	2	2	4	0	0	0	1	0	0	0	0	1	5	0	0	1
Tubercular meningitis	114	57	55	2	42	26	12	2	7	5	4	7	2	0	80	16	12	6
Phthisis pulmonalis	870	562	292	16	11	6	3	68	231	217	145	91	55	43	221	239	340	70
Marasmus	259	119	138	2	215	17	3	1	4	2	2	3	8	0	256	5	13	5
Scrofula	2	1	1	0	1	0	0	1	0	0	0	0	0	0	2	0	0	0

Rheumatism.....	28	12	10	4	2	1	0	4	6	2	3	4	4	0	5	10	7	4
Cancer.....	184	76	108	2	0	1	1	3	8	28	38	50	57	8	11	54	110	9
III.—LOCAL DISEASES.																		
Pneumonia.....	315	190	116	9	38	84	12	6	36	43	42	39	56	14	96	78	117	24
Pleurisy.....	9	8	1	0	0	0	0	0	3	0	2	1	8	0	2	1	6	0
Bronchitis.....	120	78	42	0	35	10	2	0	3	0	2	14	80	0	49	10	55	6
Other diseases of respiratory organs.....	58	42	10	6	12	7	1	7	6	3	7	7	6	2	21	11	21	5
Enteritis.....	80	47	33	0	59	4	1	2	1	4	1	1	7	0	51	6	21	2
Gastritis.....	28	18	10	0	7	0	1	0	1	5	3	2	5	4	10	2	14	2
Gastro-enteritis.....	19	10	8	1	7	0	0	3	2	4	1	0	0	2	13	2	8	1
Peritonitis (non-puerperal).....	68	33	35	0	5	1	1	6	13	16	8	4	4	11	12	14	29	13
Diseases of the liver.....	79	50	28	1	0	0	0	0	4	9	16	20	26	4	8	21	46	4
Other diseases of stomach and bow- els.....	108	66	39	3	24	8	4	5	11	6	17	16	14	3	41	26	35	6
Bright's disease and nephritis.....	163	116	45	2	1	2	0	4	15	41	23	37	37	3	17	51	86	9
Aneurism.....	16	13	3	0	0	0	0	0	0	1	5	4	5	1	2	4	10	0
Heart disease.....	431	282	155	14	9	1	0	16	31	50	68	85	141	30	43	117	250	21
Convulsions.....	126	67	58	1	76	27	6	5	1	2	1	2	4	2	116	2	8	0
Other diseases of brain and nervous system.....	108	70	33	5	12	8	0	9	2	8	11	16	31	11	32	30	36	10
IV.—DEVELOPMENTAL DISEASES.																		
Puerperal diseases.....	19	0	19	0	0	0	0	2	7	5	4	1	0	0	6	7	4	2
Old age.....	107	64	40	3	0	0	0	0	0	0	0	0	107	0	9	35	47	16
V.—EXTERNAL CAUSES.																		
Suicide.....	82	68	19	0	0	0	2	6	28	18	15	9	5	4	14	25	36	7
Heat, death from—sunstroke.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
All other causes not classified.....	1,299	796	428	80	173	52	82	51	131	122	125	136	249	228	336	320	447	196
Stillbirths.....	260	9	1	260	173	52	82	51	131	122	125	136	249	228	336	320	447	196
Totals.....	5,908	3,303	2,058	447	964	355	157	284	656	647	614	578	889	414	2,231	1,204	1,928	445

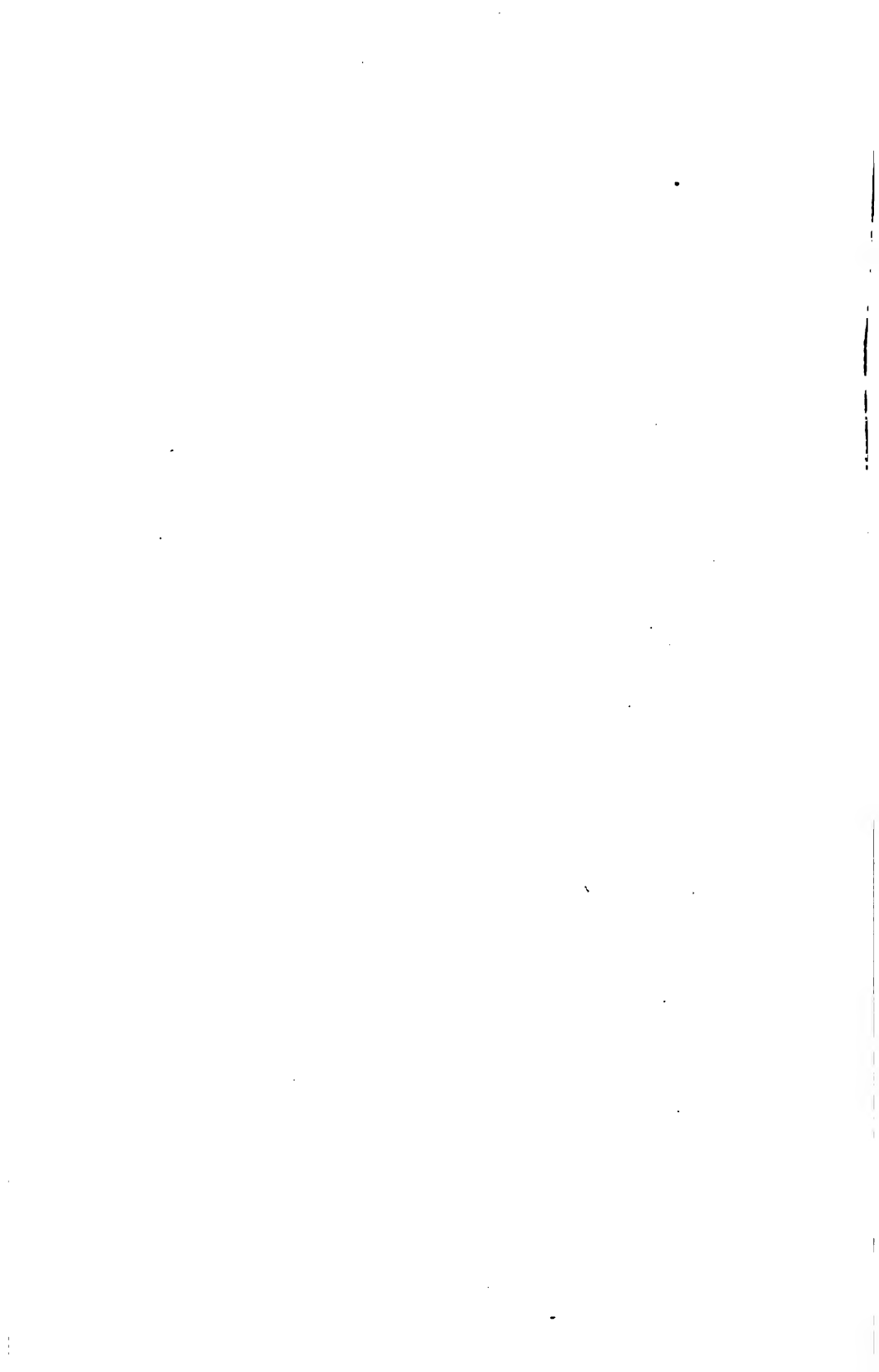
REPORT OF DEATHS

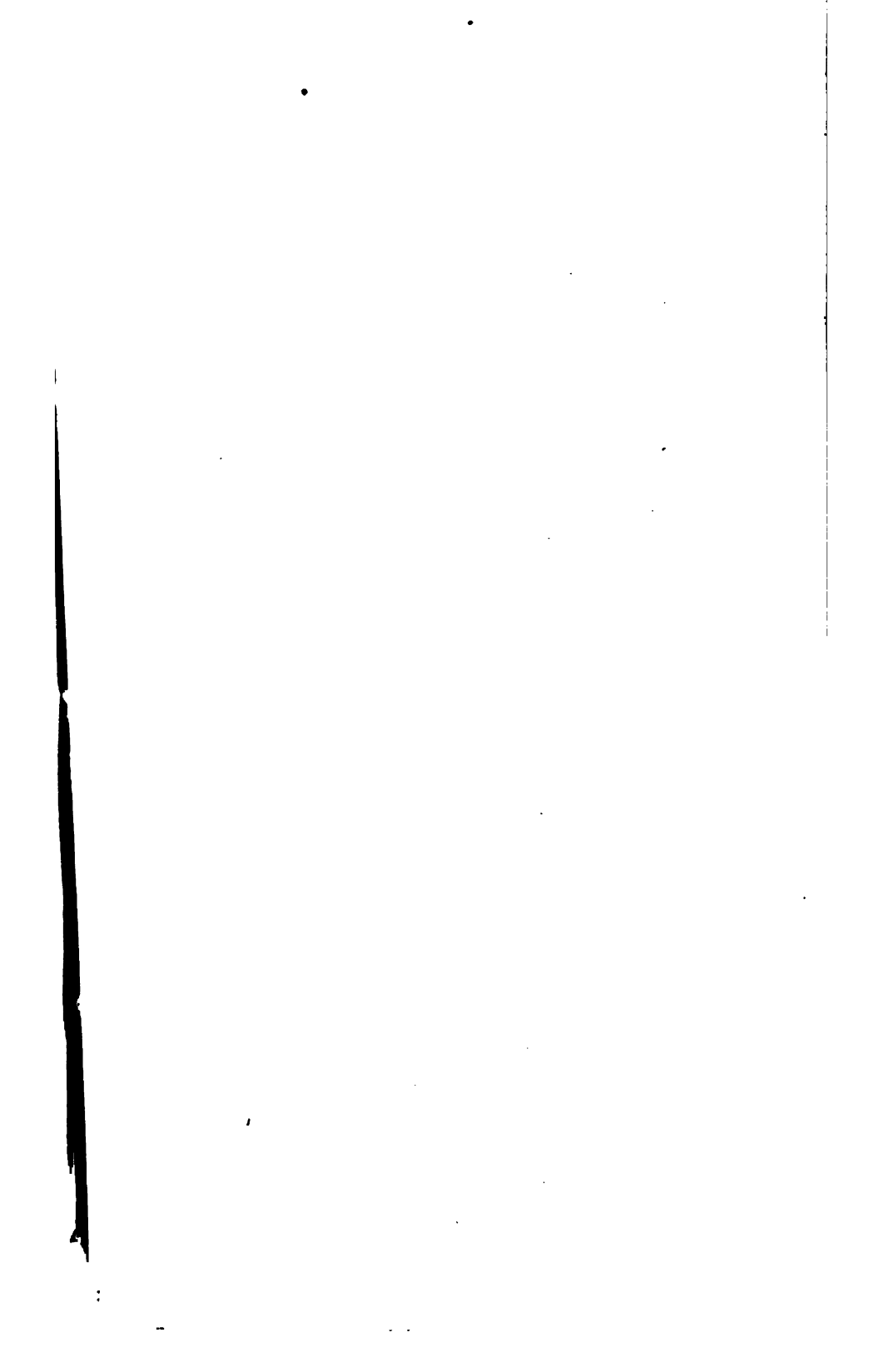
From December 31, 1889, to June 30, 1890, of those dying in the State of California.

DISEASES.	SEXES.				AGES.									NATIVITIES.				
	Total	Male	Female	Unascertained	Under 1 year	1 and under 5 years	5 and under 10 years	10 and under 20 years	20 and under 30 years	30 and under 40 years	40 and under 50 years	50 and under 60 years	60 and under 100 years	Unascertained	Pacific States	Atlantic States	Foreign Countries	Unascertained
I.—ZYMOTIC, OR EPIDEMIC.																		
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera morbus	3	1	1	1	2	11	0	0	0	0	0	0	0	1	65	2	0	1
Cholera infantum	67	31	31	5	55	14	0	0	0	0	0	0	0	1	46	8	0	0
Diarrhea and dysentery	65	28	33	4	0	0	0	0	5	1	2	3	7	0	0	0	11	0
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	2	36	1	0	0
Measles	39	17	21	1	16	16	2	2	1	0	0	0	0	0	0	3	8	2
Scarlatina	20	8	12	0	1	11	4	3	0	0	0	0	0	3	14	7	20	2
Diphtheria	98	48	41	9	39	49	26	8	0	0	1	0	0	63	63	2	2	1
Croup	38	29	37	2	16	38	12	0	0	2	2	2	4	11	5	7	4	10
Influenza	26	9	7	10	3	0	0	1	2	1	2	0	0	0	21	0	0	0
Whooping-cough	22	6	15	1	12	9	0	0	0	0	2	0	3	1	2	0	7	1
Erysipelas	9	8	1	0	0	0	0	0	1	2	2	0	0	0	6	2	0	0
Fever—Typho-malarial	9	3	4	2	1	0	0	1	1	1	2	0	1	3	54	88	29	4
Typhoid	125	71	51	3	0	8	16	28	39	12	8	4	9	0	6	1	7	0
Remittent and intermittent	13	5	8	0	1	3	0	2	2	1	2	2	2	5	5	1	8	4
Cerebro-spinal	55	34	17	4	14	14	7	6	6	0	1	0	1	0	4	0	2	0
Syphilis	6	5	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Alcoholism (direct or remote), including delirium tremens	55	44	9	2	0	0	0	0	3	7	18	9	16	2	4	17	33	1
II.—CONSTITUTIONAL DISEASES.																		
Hydrocephalus	11	6	4	1	7	2	0	1	0	0	0	0	0	1	10	0	0	1
Tubercular meningitis	147	90	52	5	39	58	19	6	6	7	7	2	1	2	120	12	14	1
Phthisis pulmonalis	1,272	842	406	25	7	18	12	108	421	286	186	103	88	50	300	361	551	60
Marasmus	223	108	115	0	180	11	1	1	1	8	2	4	19	1	192	6	25	0
Scrofula	2	2	0	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0

Rheumatism.....	22	8	11	3	0	0	1	3	2	0	5	4	4	3	8	9	7	8
Cancer.....	208	96	104	8	0	0	1	0	11	14	46	55	74	7	8	77	114	9
III.—LOCAL DISEASES.																		
Pneumonia.....	809	496	233	20	143	117	16	29	99	33	90	75	134	23	313	179	284	33
Pleurisy.....	10	6	4	0	0	0	2	1	1	0	1	2	4	7	1	4	4	1
Bronchitis.....	267	145	111	11	84	45	2	5	12	7	26	20	59	7	145	34	78	10
Other diseases of respiratory organs.....	96	59	32	5	28	4	1	3	8	3	11	10	19	7	37	18	36	5
Enteritis.....	86	46	38	1	52	7	4	2	5	3	4	2	5	1	64	6	14	1
Gastritis.....	30	18	12	0	6	2	2	0	0	2	3	4	10	1	12	5	13	0
Gastro-enteritis.....	3	7	2	0	5	1	0	1	0	1	0	0	1	1	6	0	3	0
Peritonitis (non-puerperal).....	79	39	40	0	1	7	1	6	19	19	7	13	6	0	30	21	28	0
Diseases of the liver.....	99	56	42	1	3	1	0	0	5	13	27	19	31	0	9	28	59	8
Other diseases of stomach and bow- els.....	68	31	35	0	18	4	1	2	8	3	9	4	16	1	29	16	20	1
Bright's disease and nephritis.....	179	120	56	3	4	2	2	7	10	27	40	26	56	5	28	47	95	9
Aneurism.....	19	16	2	1	1	0	0	0	1	2	4	7	4	0	6	6	12	0
Heart disease.....	540	338	182	20	10	4	2	15	33	41	104	104	199	23	59	169	297	15
Convulsions.....	155	86	66	5	103	32	9	3	0	2	1	0	0	5	138	6	6	5
Other diseases of brain and nervous system.....	169	107	48	4	21	9	5	5	11	11	20	26	50	1	39	51	56	13
IV.—DEVELOPMENTAL DISEASES.																		
Puerperal diseases.....	34	0	34	0	0	0	1	2	18	12	0	0	0	1	16	9	8	1
Old age.....	157	85	64	8	0	0	0	0	0	0	0	0	157	0	10	44	92	11
V.—EXTERNAL CAUSES.																		
Suicide.....	94	71	20	3	0	0	0	1	23	21	24	12	8	5	8	29	49	8
Heat, death from—sunstroke.....	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
All other causes not classified.....	1,533	923	541	69	170	53	32	69	155	162	215	160	346	168	445	411	538	89
Stillbirths.....	240	36	13	201											240			
Totals.....	7,226	4,174	2,614	438	1,044	555	181	315	915	753	873	672	1,393	342	2,696	1,644	2,582	806







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APPENDIX.

The Board of Health, while generally approving the papers presented in this report, is not responsible for the particular sentiments expressed.

BOARD OF HEALTH.



LEPROSY;

ITS EXTENT AND CONTROL, ORIGIN, AND GEOGRAPHICAL DISTRIBUTION.

By H. S. ORME, M.D., President State Board of Health.

The origin of leprosy, like the source of other specific maladies, is totally unknown. In its present form it has certainly prevailed for thousands of years—long anterior to the dawn of authentic history. The earliest description of the disease was written by the Hindoo Atreya, who is supposed to have lived two thousand years before Christ, but it is so vague and the symptoms so variable, that he may have included several different affections under the common term *Kushta*, as he attributed most of the morbid appearances to *wind*. Whatever this may mean, it is evident that both cause and symptoms were then very imperfectly understood. The same vagueness is found in the description of *tsaraath* by Moses in Leviticus, and the fact that both considered certain forms curable, indicates that several distinct pathological conditions were included under one term. Moses probably made no distinction between true leprosy and certain macular and scaly eruptions, since the weekly inspection of suspected cases would have no significance in leprosy, and the ceremonial observances of cleansing would be useless in this affection. All this is not strange when we consider that medical writers, until nearly the middle of the present century, made no clear distinction between typhus and typhoid fevers; and that, until the middle of the eighteenth century, both measles and scarlatina were included under the common term *morbilli*; while the Arabian physicians some centuries earlier, classed smallpox in the same category with the other two. We shall see later on that some individuals of our day regard leprosy and syphilis as variations of the same disease.

It is probable that leprosy, as we now understand it, has not been absent from the most ancient seats of civilization—China, India, and Egypt—since some undefinable period in the childhood of our race. Whether in those countries it was more or less prevalent in remote ages than now, can only be conjectured; but its history in Europe during the Christian era is so well known that we are certain of its general ravages from the twelfth to the fifteenth centuries, when it is estimated that there were as many as one thousand nine hundred lazarettos devoted to the treatment of lepers at one time in the various countries of Europe. These establishments were instituted in France in the eighth century; in Ireland, about the middle of the ninth; in Spain, at the beginning of the eleventh; in England, during the eleventh; in Scotland and the Netherlands during the twelfth, and in the following century in Norway. There is evidence of civil regulation touching lepers in Lombardy as early as the year 643, and in France in 757. The Church Council at Orleans in 549 imposed the care of lepers on the Gallic bishops, and this was confirmed by the one held at Lyons in 583. Dr. Erasmus Wilson avers that it had reached England in the

sixth century. It seems strange that leper hospitals should not have been established there for four centuries.

Since the beginning of the sixteenth century it has declined, and at the present time has mostly disappeared in that part of the world. Its introduction to Europe has been variously attributed to the arrival of the Roman Legions from eastern conquests, and the return of the Crusaders in the eleventh and twelfth centuries. It is more than probable that leprosy had gained a foothold before the Christian era, and that the returning Crusaders introduced it afresh and spread it over the land. The world's medical history during the intervening ages is exceedingly scanty and vague.

At the present time it lingers in some parts of Europe far separated from each other, and nowhere in threatening proportion. In Spain, in a lazaretto at Granada, there were fifty-three cases in 1860. Within the present decade there has been a much smaller number in a lazaretto at Barcelona. There are no legal restrictions on lepers in Spain, but it is probable that social ostracism, here, as in most parts of the world, drives them as outcasts into seclusion, and it is also probable that many small groups of lepers remain undiscovered or unmentioned in various obscure communities.*

In the British Medical Journal for January 12, 1889, is an account by Dr. Zuriaga, of the introduction of leprosy to the village of Porcent, province of Alicante, by a young man who came from a neighboring town in 1849 or 1850. In the family where he took up his residence, he ate, drank, and slept with another young man, who is said to have shown signs of leprosy within a year. Several relations of the latter became lepers within a few years, and the disease gradually spread to other families. Those who feared and avoided the lepers escaped. The writer states, since 1850, there have been about sixty cases in this little village, of which forty-five have already been fatal. There was no other known means of accounting for the outbreak, except the arrival and settlement of the first case in the community. It is much to be regretted that Dr. Zuriaga failed to trace the matter further back.

In the island of Samos, which has a population of forty-two thousand, there are forty-three registered lepers, but many others are known; only those in an advanced stage are isolated. The Prince of Samos has lately provided an asylum, where he proposes to gather all the lepers of the island. Fifteen are now in a monastery, where two hundred have died since 1835. The inhabitants are an uncleanly people. "The Samians consider leprosy as contagious; still the leper may go about freely and exercise the calling of a volunteer or porter in the sight and knowledge of all men, until some day he is brutally expelled to the mountains and abandoned to his fate, unless received into a monastery, where the monks accommodate them in huts a little removed from the convent." (U. S. Mar. Hop. Weekly Abstract, Dec. 20, 1889.) Leprosy also exists in Cyprus and probably in other Greek islands.

Dr. Dujardin-Baumetz estimates three thousand lepers in Constantinople—some in hospitals, others at large. Palestine is supposed to have about six hundred lepers. According to Dr. Max Sandreczki, of Jeru-

* Sir Morell Mackenzie, in a recent article on "The Dreadful Revival of Leprosy," sounds a loud warning note, and declares that unless prompt measures are taken, we have every prospect of seeing a great spread of this fell disease through the countries which are to-day comparatively free. The contagiousness of leprosy he considers beyond question.—Ind. Med. Jour.

salem, the Moravian brothers have a hospital there, where they desire to receive all the lepers in Palestine, but the Turkish Government fails to sustain this purpose by enforced isolation. The extent of leprosy throughout the Turkish dominions must obviously be conjectural. The same is true of Greece, southern Russia, Italy, Portugal, and Iceland, in all of which countries it is believed to have limited existence. The absence of special health authorities accounts for want of precise information on the subject.

LEPROSY IN NORWAY.

In Norway, more than in any other European country, leprosy has recently been a subject of serious attention. In 1856, an attempt was made to enumerate the lepers, and to isolate the worst cases in asylums, for a scientific study of the disease and different methods of treatment. Of these, there are said to be three at Bergen, one at Moldi, and one at Drontheim. Owing to defect of legislation, the enumeration has never been complete nor isolation compulsory. Out of a population of one million five hundred thousand in 1856, it is probable that there were about three thousand lepers. Of those known, only 8 per cent were collected in hospitals during the first year, but the number has since increased to 39 per cent. Naturally the worst cases go to hospitals, and now the deaths there exceed those at home; but formerly the reverse was the case. The following table exhibits the vital movement of the leper population during the twenty-five years ending 1880:

TABLE OF ALL KNOWN LEPERS IN NORWAY, 1856-1880.

YEAR.	Total at Beginning of Year.	New Cases.	Diminution both In and Outside Asylums.			Remaining at End of Year.		Total at End of Year.
			Died.	Dis-ch'd.	Cured.	At Home.	In Asy-lums.	
1856						2,628	235	2,863
1857	2,863	242	293	16	2	2,367	427	2,794
1858	2,794	235	225	4	2	2,323	475	2,798
1859	2,798	249	213	8	7	2,290	523	2,819
1860	2,819	228	253	9	2	2,242	539	2,781
1861	2,781	246	238	14	4	2,060	711	2,771
1862	2,771	201	212	12	4	2,046	698	2,744
1863	2,744	189	195	6	4	1,979	749	2,728
1864	2,728	213	202	9	1	1,948	781	2,729
1865	2,729	200	206	9	5	1,938	772	2,710
1866	2,710	220	213	10	3	1,909	795	2,704
1867	2,704	185	182	7	5	1,898	787	2,685
1868	2,685	215	211	7	6	1,888	788	2,676
1869	2,676	167	200	16	8	1,832	787	2,619
1870	2,619	160	230	13	3	1,769	764	2,533
1871	2,533	153	238	16	3	1,682	747	2,429
1872	2,429	126	205	9	5	1,628	704	2,336
1873	2,336	122	177	18	8	1,583	672	2,255
1874	2,255	135	183	10	5	1,549	643	2,192
1875	2,192	123	203	14	5	1,470	623	2,093
1876	2,093	110	187	6	2	1,395	613	2,008
1877	2,008	90	165	7	3	1,294	629	1,923
1878	1,923	90	139	10	9	1,237	618	1,855
1879	1,855	39	162	11	4	1,115	602	1,717
1880	1,717	29	150	7	7	965	617	1,582

Diminution in the same ratio since that date would reduce the lepers in 1890 to about one thousand, or two thirds in thirty-five years under persuasive isolation of the worst cases. It is not improbable that the

estimate of home cases is very defective. Dr. H. V. Carter supposes that not less than five hundred cases have escaped the enumeration. If this be true, there would still be more than fifteen hundred lepers in the country. On the other hand, Dr. H. McDonald, of Leith, Scotland, who visited Norway in 1889, writes that the last return shows eight hundred and forty-six lepers in that country. The truth is probably somewhere between these wide extremes.

IN OTHER COUNTRIES.

Leprosy is averred to have existed in the Canary Islands at the date of the Spanish conquest. It does not clearly appear whether the aborigines were affected prior to the arrival of the Spaniards. Dr. Torrens, in charge of the leper hospital at Las Palmas, reports fifty-four lepers as inmates. There is no compulsory isolation, and the malady is not thought to be increasing.

According to Dr. W. A. Kynsey, leprosy was found on the island of Ceylon at the date of the Dutch occupation (about 1640), having existed from a remote period. The anæsthetic form is the most prevalent. It is believed to have increased since 1862, but this is only conjectural, as there is no registration of lepers. At that date there were sixty-three lepers in the lazaret; and in 1886 there were one hundred and fifty-one. This number by no means represents the whole of the leper population, for they resort to the asylum only when too much disabled for their usual occupations.

On the authority of Vidal, leprosy was unknown on the island of Mauritius in 1765; but this is disputed and is improbable, as there was intercourse both with the African mainland and with India. Now the cases are numbered by thousands.

It is also known to exist in Madagascar, but its extent is not ascertained. The same may be said of most countries of Africa, also Arabia and Persia.

As to leprosy in British India, A. Mackenzie, Secretary of the Indian Government, reported in 1885 to the Hawaiian Board of Health that there had been no special legislation on the subject and no enforced segregation of lepers. There are sixteen separate leper asylums, most of them sustained by public funds, wholly or partially. Whether the disease be increasing or diminishing can only be conjectured, but probably it is nearly stationary. Dr. H. V. Carter, of the Bombay army, states that it prevails in all parts of the presidency, but more upon the coast than the island, and more among the lower castes than the Brahmins. Europeans are almost exempt, and next to them the Eurasians. The anæsthetic form is far more common than the tubercular, and he does not think it shortens life greatly. An attempt has been made to enumerate the lepers of British India, but the result is manifestly imperfect. Leprosy is not recognized by the natives in an early stage, and is probably so confounded with some cutaneous affections that many cases are improperly excluded and included. Besides, the census gives nearly four and one half males to one female, which is undoubtedly erroneous. The accompanying table is therefore much too low an estimate, for according to the conjecture of some writers two hundred and fifty thousand lepers will not be far from the actual truth:

TABLE OF REGISTERED LEPEHS IN INDIA, WITH POPULATION AND RATIO.

PRESIDENCY.	Total Pop- ulation.	Total Lepers.	Ratio of Lep- ers to 10,000.
Bengal	156,201,210	98,017	6.3
Madras	31,170,531	14,525	4.7
Bombay	23,395,663	12,382	5.3
Totals	210,767,504	124,924	5.9

Leprosy exists in Siam, but more among the Chinese residents than the Siamese. There is no legal regulation over lepers, and no hospitals for their treatment.

Dr. W. H. Park supposes that there are one hundred and fifty thousand lepers in China—chiefly in the southern provinces. Dr. William Hillebrand, formerly of the Sandwich Islands, states that leprosy is not found in northern China. The authorities consign all recognized or declared lepers to special villages, where they live secluded. No healthy relatives are allowed to accompany them, but marriages among lepers are tolerated, and the children there born have to remain. The lepers in the three asylums near Canton are allowed to visit the city by day, and to receive visits. Dr. K. Yamanato stated to the Hawaiian authorities in 1883 that there are very few lepers in Japan, perhaps one in twenty thousand, or one thousand seven hundred and fifty in a population of thirty-five million. No Government hospital is provided, but there is one private establishment at Tokio. No legal segregation is declared, but lepers are secluded by social ostracism. This manifestly applies only to advanced cases, about which there could be no mistake.

The minister for the colonies of the Netherlands reports that leprosy exists in all the Dutch East Indian possessions, except the little Sunda Islands, and the northern part of Celebes. "Previous to 1865 there were local and provincial regulations enforcing separation for leprosy." In 1868 these regulations were abolished, on the ground that the disease is not contagious. In the Dutch East Indies there were fourteen asylums in 1865. Six now exist, which contain in all one hundred and eighty-nine inmates—Europeans, natives, Chinese, and Arabs. The asylums are sustained about equally by Government and by private individuals.

"Leprosy is reported to have found its way to New Caledonia, the French penal colony, and already there are hundreds of cases among the natives and convicts."—*Journal American Medical Association*, March 22, 1890.

Australia and New Zealand have recently been invaded, through Chinese immigration, but so far the subject has not attracted much attention.

"The total number of lepers under official cognizance in the Australian Colonies at the close of 1889 was thirty, there being in New South Wales, twelve (nine Chinese, one Japanese, and two whites); in Victoria, four (Chinese); in South Australia, two (Chinese); in Queensland, six (four Chinese, one Malaccan, and one from the Straits); in West Australia, one (Chinese); in Fiji, five (two Fijians, two New Hebrides, and one Solomon Island)."—*London Lancet*, May 24, 1890.

In a paper read before the Epidemiological Society of London in 1889, Dr. P. S. Abraham stated that the belief in the increase of leprosy at the Cape of Good Hope was so strong, that a repression Act had passed

in 1884. From medical reports on the subject he thought there was good foundation for this action.

IN SANDWICH ISLANDS.

The history of leprosy in the Sandwich Islands is of surpassing interest, owing to its dreadful ravages and the recent date of its recognized appearance. Its introduction has generally been charged to Chinese immigrants or coolies, and this notion is connected with the vernacular term, "mai pake," Chinese sickness.

The common agreement is that leprosy had not made much headway previous to 1860. Dr. Hillebrand avers that it was brought by the Chinese in 1848.* Dr. Saxe states: "Leprosy was unknown to the natives until 1848, when it was introduced by the Chinese, and Ahia, a Chinaman, was the first leper recognized by the Hawaiian Board of Health." On this point, Dr. G. L. Fitch, who resided several years on the Islands, remarks: "As a matter of fact, Ahia was a full-blooded native, Captain of the body guard of Kamehameha III. Still further, Ahia was a leper as early as 1840." Dr. Fitch adds that Rev. J. D. Paris, one of the early missionaries, writing in 1884, mentions a man who had been declared a leper in his presence by a physician. Mr. Paris continues: "If this was leprosy, it had existed at the Islands long before the introduction of the gospel in 1820. The first Chinamen who came here were coolies, brought in 1850 or 1851. There were no lepers, nor has there been a case of leprosy among Chinamen to my knowledge, until within the last ten years."—Pacific Medical and Surgical Journal, October, 1885.

Dr. Mouritz, resident physician at the Molokai leper settlement, adduces evidence from missionaries of the prevalence of leprosy among the natives as early as 1823. Rev. C. S. Stewart entered the following in his diary July 4, 1823: "Indeed, we seldom walk out without meeting many whose appearance of misery and disease is appalling, and some so remediless and disgusting that we are compelled to close our eyes against a sight that fills us with horror. Cases of ophthalmic scrofula and elephantiasis are common." The elephantiasis must have been leprosy, for elephantiasis arabum is acknowledged to be almost or quite absent from those islands.

Since the discovery of the Sandwich Islands in 1778, they have often been visited by ships manned by sailors from regions of the world where leprosy constantly prevails, and leprous sailors might have planted the disease by cohabitation with the native women. Besides, large numbers of Hawaiian seamen have sailed to all the shores of the Pacific and Indian Oceans, and they could easily have contracted it by intercourse with lepers abroad, and afterwards have communicated it to their countrymen at home.

One indication that leprosy is not an ancient occupant of these islands, is the fact that the majority of the cases are of the tubercular

*Dr. Emerson, President of the Board of Health of the Hawaiian Kingdom, says in his report for 1888: "Leprosy was first clearly made out to exist in this country about the year 1840, in the person of one Naea, a messenger of the chiefs, who died in 1852. The friends of Naea thought he had the disease for about ten years before his death. His case was reported by the Rev. D. D. Baldwin, M.D., of Lahaina, in a communication to the Minister of the Interior, Hon. Charles G. Hopkins, dated May 26, 1864. In 1863 Dr. Baldwin obtained, by reports from the deacons of his church at Lahaina, the names of sixty people who were supposed to be affected with the disease."

form, and formerly the preponderance was still more marked; while in India and China, where it has existed many centuries, the anæsthetic type is the prevailing one.

In 1886, of six hundred and fifty-two cases at the Molokai Settlement, three hundred and thirty-three were classed as tubercular, two hundred and four as anæsthetic, and one hundred and fifteen as mixed. The census shows leper population, March 31, 1888, at Molokai—males, four hundred and ninety-five; females, two hundred and fifty-four; total, seven hundred and forty-nine.

By 1864 leprosy had increased among the natives to such an extent that the authorities and people of intelligence became alarmed, and in 1865 a law was enacted providing for the isolation of all lepers. There has always been great difficulty in its execution, not from open resistance, but from the hiding and secretion of lepers. Several characteristics, on the amiable side of human nature, obtain to excess among these simple people, which promotes in the highest degree the spread of contagious diseases.

Christianity and civilization have failed to eradicate the indiscriminate sexual relations which have always existed, and intercourse with foreign ships' crews since 1779, the date of Captain Cook's arrival, has saturated the population with venereal diseases, so that a great many of the people of both sexes are believed to be subjects of syphilis, either inherited or acquired. Again, these people are the most friendly and sociable creatures in the world, both with strangers and each other. Persons suffering with the most loathsome diseases are not to them objects of abhorrence, but rather of benevolent attention. In their homes and in their social relations they observe the closest habits of affectionate intercourse, eating with the fingers from a common dish, passing the pipe from one mouth to another, and sleeping together indiscriminately in their small, close habitations. The race distribution of leprosy in these islands is striking. Nearly 99 per cent of the known cases have been among the native race. Though the Chinese are accused of introducing the disease, they have contributed very few to the leper population; and the President of the Board of Health in 1886 asserted that he had not known of an imported Chinese leper since the enactment of the anti-leprosy law.

The unexampled spread of leprosy in these islands, after 1870, may be attributed to several causes. There can be no doubt that the lowering of the vital stamina of the race by the great prevalence of syphilis, prepared them for the inroads of any disease that might threaten. During this period smallpox also scourged the people, and in 1868 there began a general vaccination, in which virus was taken indiscriminately from human subjects. This reckless practice doubtless contributed greatly to the spread of both syphilis and leprosy.

The following table has been compiled from the official reports of the Hawaiian Board of Health, and may be accepted as substantially correct. It is apparent that the proportion of lepers segregated, to those at large, has steadily increased from the beginning of the Act; and it is probable the total number on the islands at the present time is not far from one thousand five hundred. With strict enforcement of the law, there ought to be a marked decrease of the leper population during the present decade.

TABLE OF LEPERS AT THE MOLOKAI SETTLEMENT, HAWAIIAN ISLANDS, 1866-1886.

YEAR.	LEPERS RECEIVED.			Present January 1.	Died	Discharged.	Alive in 1886.	NATIONALITIES.			
	Male.	Female.	Total.					Hawai.	White.	Chinese.	Others.
1866	108	38	141		26	10		139		2	
1867	57	13	70	105	25	7		68	1		1
1868	76	39	115	143	28	2		113	1	1	
1869	73	53	126	228	59	11		126			
1870	31	26	57	284	58	4	6	57			
1871	123	55	183	279	51	9	5	183			
1872	69	36	105	402	64	4	8	105			
1873	295	192	487	459	156	21	14	483		3	1
1874	53	38	91	749	161	8	8	90	1		
1875	128	84	212	671	168	14	16	207	3	1	1
1876	57	39	96	706	122	3	5	95	1		
1877	110	53	163	677	129	1	13	162		1	
1878	136	103	239	710	147		27	238	1		
1879	82	43	125	802	209	1	37	123	1	1	
1880	34	17	51	717	152	10	41	50	1		
1881	156	76	232	606	132		51	229	2	1	
1882	53	18	71	706	121	13	60	68	1	2	
1883	185	116	301	643	150	10	149	300		1	
1884	71	37	108	784	168	7	93	99	2	6	1
1885	75	28	103	717	142	25	96	99	1	3	
1886	16	7	23	653	20		23				
Totals.	1,988	1,111	3,099	11,021	2,283	160	632	3,034	16	22	4

Of the above there were—

Full-blooded Hawaiians	2,997
Mixed Hawaiians	37
Chinese	22
Whites	16
Other nationalities	4
Male Hawaiians, 1,903; female Hawaiians, 1,094.	

Dr. N. B. Emerson, President of the Board of Health, reported the inmates present at the Molokai Settlement January 15, 1889, as follows:

Males over ten years of age	651
Males under ten years of age	15
Females over ten years of age	360
Females under ten years of age	10
Total	1,036

Of the above there are eight Chinese and eight or ten whites (American, English, German, French, etc.). The number of lepers still at large is small and rapidly diminishing. March 31, 1888, they were estimated to be altogether six hundred and forty-four.

INTRODUCTION INTO AMERICA, ETC.

There is no apparent reason to suppose that leprosy existed in any part of the New World prior to its discovery by Columbus. At that date it prevailed throughout Europe, and followed the tide of emigration. Whether it was introduced independently from Africa is conjectural, but it has certainly been found more among the people of the African race than among all others in America. Their habits of life have always favored the propagation of spreading diseases, and leprosy has ever

found its victims chiefly among people and individuals who live in closest social relations. With the advance of civilization, the enlargement of habitations, abundance of clean garments and beds, and the use of separate table utensils, the disease has declined and nearly disappeared from the civilized world.

In British Guiana leprosy is supposed to have come with African slaves. Negro lepers were isolated, and the disease was confined to them. In 1831 they numbered four hundred and thirty-one, and were then sent to a special establishment on the river Pomeroon. Near by were several Indian tribes, all of which withdrew, except the Warrows, who associated with the lepers. In 1842 a census was taken of the Indians, and many lepers were found, but all were Warrows. In 1838 came emancipation, followed by the dispersion of the negroes and the introduction of coolies from India and China, some of whom were probably lepers. Now, two in one thousand of the population are lepers, including whites, negroes, Indians, coolies, and the mixed races.—Pacific Medical and Surgical Journal, January, 1887.

There is good reason to believe that leprosy appeared in the West Indian Islands not long after their settlement by Europeans. Dr. Hans Sloane, who was in Jamaica in 1687, mentions a case and describes native plants used in the treatment of the disease.—Professor Jones, in New Orleans Medical and Surgical Journal, March, 1878.

In Jamaica, at present there are said to be seven or eight hundred lepers—negroes and mulattoes. In Barbadoes, it is thought that the increase of lepers is four times as rapid as that of the population. On the island of Trinidad, according to Dr. W. H. Park, there were three lepers in 1805, and in 1878, about eight hundred and sixty. In the British West Indies, as in most of the other British colonies, there is no isolation of lepers.

It is quite probable that leprosy exists on most, if not all the other West India Islands, but its extent is unknown.

In the American colonies of the Netherlands, lepers are strictly segregated in Government asylums. The one in Surinam contains one hundred and two inmates, of whom, in 1883, thirty-seven were Europeans, fifty-six natives, and nine immigrants from British India. In 1884, the asylum in Curacon contained thirteen inmates; that in St. Martin, ten, and that in St. Eustatius, nineteen. Their isolation results from general belief in these colonies of the contagiousness of leprosy, which belief is not entertained in the East Indian colonies.

I have no precise information upon leprosy in other South American States, except a denial of its existence in Chili to the inquiry of the Hawaiian Government. It is said to exist in Brazil, and probably is absent from few, if any, of those countries.

Dr. Miguel Valladores, physician to the Lazaretto of Guatemala, reports to the Hawaiian Government that leprosy is almost unknown among the aboriginal Indians of pure race. His patients have all been of mixed Spanish and Indian blood. He states that lepers are strictly segregated, and that he had under his care nine men and six women. Isolation has only lately been put in force. Previously, leprosy was on the increase. The Hawaiian Consul remarks: "Well-to-do families contrive to secrete an afflicted member of the family in some remote place; this, to my personal knowledge." I have no doubt that the practice of *secreting lepers is general throughout the world*, wherever the dis-

ease prevails, and it is not difficult, in an early stage, for lepers to evade the authorities and go about their usual business. I have no particulars from other Central American States, but am disposed to believe that occasional cases of this disease might readily be found among the lowest class of people.

Dr. Gomez, Director of the Lazar Department, Juarez Hospital, Mexico, reports that leprosy, called "Mal de San Lazaro," exists principally in the western regions of the republic. During his twelve years' service, he has had no negroes under his charge, but observes no other race preferences.

The disease has been known in Mexico since the conquest, and Cortez founded a lazaret. At the present time, lepers in the City of Mexico are admitted to separate wards in a civil hospital for each sex. The average number of patients is thirty. The Superior Council of Health reported in 1886 that leprosy existed in Mexico prior to the conquest. There have been no special leper hospitals for more than twenty years, but lepers are received in civil hospitals throughout the country. In early times segregation in special hospitals was practiced. It is the belief of the Council that leprosy has decreased in Mexico in the last seventy-five years, but the fact is not accounted for. As to its ancient prevalence, may not early observers have confounded true leprosy with Elephantiasis Arabum, or Bardadoes leg?

IN BRITISH COLUMBIA.

Sporadic cases of leprosy have been recognized in British Columbia within a few years. The most notable focus of the malady at present on this continent is at Tracadie, N. B., in that portion bordering on the bay of Chaleurs and river St. Lawrence. Its origin is not precisely known. Dr. W. H. Park states that it began with a woman named Ursale Landry, in 1819. Prof. J. C. White (Am. J. Med. Sci., Oct., '82) refers its source, in 1815, to a woman named Benoit, whose mother came from Normandy. As no preventive measures were used, it gradually spread among different families, but mostly among the descendants of the first case. The first leper hospital was established in 1844, and thirty-two cases were received within five years. The hospital at Tracadie was founded in 1849, and between this date and 1882, more than one hundred patients were received. None are admitted during the first year of the affliction, and very few before the third year. Belief in its contagiousness is general among the people, and plainly recognized lepers are impelled by social ostracism to go into retirement. Nearly all the cases have been of French descent. So far, no Indian has fallen a victim.

The following table exhibits the vital movement for the period 1875-85:

TABLE OF LEPERS IN THE PROVINCE OF NEW BRUNSWICK, 1875-1885.

YEAR.	IN LAZARET.		OUTSIDE.		TOTAL.		NEW CASES.		DIED.		Total
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	
1875.....	13	7	6	10	20	16	1	1	2	-----	36
1876.....	10	5	7	12	17	17	1	2	3	2	34
1877.....	6	8	7	9	13	17	2	1	6	1	30
1878.....	9	8	5	7	14	15	2	2	1	3	29
1879.....	8	7	4	8	12	15	1	2	3	2	27
1880.....	6	9	5	8	11	17	1	2	2	-----	28
1881.....	8	13	5	3	13	16	2	-----	-----	1	29
1882.....	11	14	4	1	15	15	2	-----	-----	1	30
1883.....	10	12	4	1	14	13	-----	-----	1	2	27
1884.....	10	11	3	1	13	12	-----	-----	1	1	25
1885.....	11	10	2	1	13	11	-----	-----	-----	1	24

Dr. A. C. Smith, physician in charge in December, 1889, reported twenty inmates—nine males and eleven females. Two were admitted during the year, in which time there were no deaths. In September, 1889, he reported about eighteen lepers in Tracadie. It thus appears that the disease has steadily diminished since the plan of isolation was established, the apparent increase being accountable by discovery of cases previously concealed, or not recognized. As will be seen hereafter, there have been some desertions.

Professor White gives a group of eleven cases of leprosy, which were traced out in the island of Cape Breton, six of whom consisted of a woman and her five children. There was also a son-in-law and two children, and another son-in-law whose wife was not a leper, but he used to sleep with one of his leper brothers-in-law. The other case waited on one of the sons, and washed and laid him out after death.

The first case became affected in 1852, and the last in 1870. All were dead before 1882, except the last, and he was far advanced. It is worthy of notice that the mother of these children and first of the group was born on Prince Edward's Island in 1836, which island is not far from the New Brunswick seat of leprosy.

IN THE UNITED STATES.

Somewhat more than twenty-five years ago the discovery was made of the existence of leprosy among immigrants from Norway in several of the new Northwestern States of the Union. From that time to the present scattering cases have occurred, but the disease shows no tendency to spread. It is easy to trace direct connection between them and the leprous population of western Norway.

In 1863 Dr. Holmboe, of Norway, visited his countrymen in those States, and found twelve lepers among them, most of them diseased before emigrating. In no case had a native child of this country developed the disease, and it was observed to pursue a milder and more prolonged course in this country than in Norway. (Prof. J. C. White in Am. J. M. Sci., Oct., 1882). It has been asserted that Norwegian lepers have been advised at home to emigrate to this country for the benefit of their health.

In 1869-70, Prof. Wm. Boeck, of Christiania, visited the Northwestern States, and found eighteen cases in Wisconsin, Iowa, and Minnesota, all from western Norway. Of these, nine were of the anæsthetic type, three tubercular, and six mixed. Four of them knew of no leprous relatives. (Report Minnesota Board of Health, 1884.) Up to 1879, twenty-six cases had been reported in Wisconsin, Iowa, Minnesota, and Nebraska, among the Norwegian and Swedish immigrants. A child of a leprous father, born in this country, was reported by Dr. Hyde in 1879, the only native leper of this group. (Dr. J. L. Babcock, New York Medical Record, September 15, 1888.) In 1886, Dr. K. Hoegh, member of the Wisconsin State Board of Health, as the result of his investigation, stated his opinion that at least one hundred and sixty Norwegian lepers (probably more) had come to this country since 1858. Norwegian records contain the names of sixty-eight. Many developed the disease after arrival, and some doubtless escaped notice. In 1886 he knew of three cases in that State.

The State Board of Health of Minnesota, in October, 1889, reported to me seven cases known in the State. Only one was isolated. All the others were able to attend to their usual business. All were Norwegians and males, thirty-five to seventy-three years old, and affected with leprosy from eleven to twenty-nine years. Five of them had developed it before emigration to this country. Two of them have healthy children. The others have no living children. Between 1868 and 1889, there had been nineteen deaths. Dr. G. A. Hansen, Surgeon of the Bergen (Norway) Leper Hospital, in a recent visit to the Northwestern States, estimates that there were only sixteen or seventeen lepers then alive.—*Occi. Med. T.*, August, 1889.

In a book entitled "Concise Natural History of East and West Florida," published at New York, in 1876, and quoted by Prof. Joseph Jones, of New Orleans, is found a description of a disease then prevailing among the negroes, which was probably leprosy. The evidence that the malady then prevailed in the Spanish Province of Louisiana is stronger.

Gayarré, in his history of Louisiana, Vol. 3, p. 167, says: "One of the first measures of Miro's administration was one of charity. It is remarkable that leprosy, which is now so rare a disease, was then not an uncommon affliction in Louisiana. Those who were attacked with this loathsome infirmity generally congregated about New Orleans, where they obtained more abundant alms than in any other part of the colony. They naturally were objects of disgust and fear, and the unrestrained intercourse which they were permitted to have with the rest of the population, was calculated to propagate the distemper. Ullon (whose administration began in 1766) had attempted to stop this evil by confining some of the lepers at the Balize (mouth of the Mississippi River), but this measure has created great discomfort and has been abandoned. Miro now determined to act with more efficacy in this matter, and, on his recommendation, the Cabildo, or Council, caused a hospital to be erected for the reception of these unfortunate beings in the rear of the city. * * * In the course of a few years, the number of these patients gradually diminished either by death or transportation, the disease disappeared almost entirely, and the hospital went to decay."

From this time, leprosy seems to have attracted no public attention

in Louisiana until about 1879, when the State Medical Society undertook its investigation. At that date, Dr. Salomon had discovered six cases in New Orleans, and six more were reported in Vermilion Parish, near the Gulf of Mexico. This last group originated with a woman born in Louisiana, whose father came from the south of France. It does not appear that he was a leper, nor is there evidence of leprosy in the previous history of the family. This woman developed the malady in 1866, and died in 1870. In 1880, Prof. Jos. Jones, then President of the State Board of Health of Louisiana, visited the parish of La Fourche, and there found another group of twelve cases. There was strong evidence that the disease had existed for several generations. These cases in the two country parishes (counties) were all French creoles, and of the humblest class of white people. It, therefore, appears that at least eighteen lepers were found in Louisiana, in 1880, with a strong probability that a considerable additional number remained undiscovered. A report from the Louisiana Board of Health, in May, 1889, gave twelve cases in the before mentioned parish of La Fourche, three positive and three doubtful cases at St. Martinsville, and forty-two known cases at New Orleans. It is remarked: "The cases in St. Martinsville are all descendants of one man who died some years ago of leprosy, he having inherited the disease after it had skipped one generation.

The compiler of the accompanying table of cases in New Orleans, being clinical lecturer on dermatology at the medical college, and polyclinic and dermatologist to two hospitals, has had unusual opportunities for observation, of which he has fully availed himself. It is probable that hardly a case in that city has escaped his notice, and that the majority in the State have come under his eye. It is to be noted that only ten had relatives similarly affected; and Dr. Blanc remarks: "Some of the patients have had perfectly healthy children after the disease began, but the rule seems to be in females for pregnancy to end in miscarriage or in a weak, delicate child." To this it might be added that lepers generally lose the procreative function. It remains to say that there are no legal restrictions over lepers in Louisiana, and that they are received into the New Orleans Charity Hospital and placed in the ordinary surgical wards with other patients. This practice, however, has not the approval of medical men, but is adopted for want of other provision.

TABLE OF LEPROS IN NEW ORLEANS, 1889. By Dr. H. W. Blanc.

Case	Age	Nativity.	Color	Sex	Variety.	Nativity of Parents.	Dura- tion.	Relatives with Leprosy.
1	60	Germany	Wh.	F.	Anas.	Germany	1 yr.	
2	16	N. Orleans	Wh.	M.	Tub.		2 yrs.	•
3	35	Germany	Wh.	F.	M. A.	Germany	5 yrs.*	
4	29	N. Orleans	Wh.	M.	T.		3 yrs.	
5	25	Missouri	Wh.	F.	T.		7 yrs.	
6	28	N. Orleans	Wh.	F.	M. T.	Ireland	7 yrs.	
7	26	Louisiana	Bl.	F.	T.	F., Italy; M., La.	3 yrs.	
8	75	Louisiana	Wh.	F.	M. T.		2 yrs.	
9	48	Germany	Wh.	M.	M. A.	Germany	5 mos.	
10	35	Germany	Wh.	M.	T. An.	Germany	10 yrs.	Stepmother, 2 half brothers.
11	47	Louisiana	Wh.	F.	T.		6 yrs.	
12	46	Austria	Wh.	M.	M. A.	Austria	10 yrs.	
13	27	N. Orleans	Wh.	M.	T. A.	Ireland	14 yrs.	
14	35	N. Orleans	Wh.	M.	M.		18 mos.	
15	65	Ireland	Wh.	M.	M. A.	F., Ireland		
16	10	N. Orleans	Wh.	M.	T.	Germany	5 yrs.	
17	63	Germany	Wh.	M.	A.	Germany	18 mos.	
18	27	N. Orleans	Wh.	M.	T.			Mother.
19	57	Germany	Wh.	F.	T. A.	Germany	8 yrs.†	
20	27	N. Orleans	Wh.	M.	M. A.	Ireland	18 mo.‡	
21	24	N. Orleans	Wh.	M.	A.		3 yrs.	Uncertain.
22	18	N. Orleans	Wh.	M.	T. A.	F., Ger.; M., Ire.		
23	45	N. Orleans	Wh.	F.	T.		6 yrs.	Two daughters.
24	17	N. Orleans	Wh.	F.	T.	Miss., N. O.	4 yrs.	Mother and sister.
25	15	N. Orleans	Wh.	F.	T.	Miss., N. O.	4 yrs.	Mother and sister.
26	11	Louisiana	Wh.	M.	T.		5 yrs.	
27	14	N. Orleans	Wh.	F.	M.		4 yrs.	
28	16	Louisiana	Wh.	M.	T.	Louisiana	10 yrs.	Father and several relatives.
29	15	N. Orleans	Wh.	M.	T.		5 yrs.	Brother.
30	13	N. Orleans	Wh.	M.	T.		2 yrs.	Brother.
31	51	England	Wh.	M.	T.	England	5 wks.§	
32	28	Louisiana	Bl.	M.	A.		8 yrs.||	
33	54	Germany	Wh.	M.	T.	Germany	7 yrs.	
34	18	N. Orleans	Wh.	F.	T.	F., Ger.; M., N. O.	4 yrs.	
35	21	Louisiana	Bl.	M.	T.	Louisiana	over 1y.	Mothersuspicious.
36	21	N. Orleans	Wh.	M.	T.	Ireland	1 yr.	
37	17	N. Orleans	Wh.	M.	T.	Germany	1 yr.	
38	36	N. Orleans	Wh.	F.	M.	F., Fran.; M., Cuba	4 mos.	
39	30	Italy	Wh.	M.	A.			
40	45	N. Orleans	Bl.	F.	A.			
41	48	France	Wh.	F.	A.			Sister.
42	19	N. Orleans	Bl.	M.	A.			

* Became leprosy in La Fourche Parish.

† Washed dead body of a leper with abraded hands.

‡ Syphilitic; had often visited St. Martinsville.

§ Long syphilitic; lived at St. Martinsville in 1872, and nursed Case 5 in hospital.

|| From St. Martinsville.

|| From St. Martinsville.

Prof. Joseph Jones, of New Orleans, mentions a case of leprosy that he saw less than forty years ago among negroes on the coast of Georgia, who had been brought from Africa. The disease has probably disappeared, as there are no recent accounts of it.

Prof. J. C. White (Am. J. M. Sci., Oct., 1882) gives a table of sixteen cases, compiled by Dr. J. F. M. Geddings, of Charleston, S. C., in 1876. None occurred to his knowledge subsequent to 1876, and at that date all were known to be dead except two, whose fate was not ascertained. Of these, eleven were whites, four mulattoes, and one black. Four were Jews, one Irish, fifteen appear to have been native Americans, and the remaining negro may have been. All occurred between 1846 and 1876. Dr. Geddings remarks: "I can form no opinion as to when the disease

first made its appearance in South Carolina. * * * The first case could not in any way be connected with the old cases of the past century in the Gulf States. Both of the first cases were Jews from families coming to this country early in this century. Nor could any of the cases have had any connection with the recently imported occurrence in Louisiana, nor from African descent through slaves." With regard to connection between these cases he remarks: "The mulatto named Lazarus is said to be the son of a Jew; the others are of uncertain descent. With the exception of this case there was no special association." It is greatly to be regretted that the origin of these cases was not discovered. Dr. T. G. Simmons, of Charleston, a member of the State Board of Health, informed me in September, 1889, that there had recently been a death from leprosy in that city, and that he knew of four other cases there. Dr. W. H. Geddings, now of Aiken, S. C., but formerly of Charleston, informs me that he had a case under his care in 1884. It is not stated whether these recent cases have any connection with the above mentioned list of sixteen lepers.

I was informed by Dr. Joseph Y. Porter, Secretary of the Florida State Board of Health, in April, 1890, that two or three years ago *six cases* of leprosy existed at Key West to his knowledge. This was previous to the formation of that Board, but these unfortunate persons were cared for by their friends. As leprosy is known to exist at Havana, the Board of Health of Monroe County, Florida, has required that passengers from that city should bring certificates of exemption from this disease, signed by Dr. Burgess, Sanitary Inspector of the United States Marine Hospital Service, attached to the United States Consulate at Havana.

Dr. George H. Fox (Popular Science Monthly, April, 1884) asserts that during the last ten or fifteen years, cases of leprosy have constantly been present in the New York hospitals. Dr. R. W. Taylor (New York Medical Journal, July 13, 1889) remarks that during the past fifteen years, he has seen almost constantly one to three lepers in the crowded wards of the hospitals on Blackwell's Island, New York.

Dr. William M. Smith, Health Officer, New York City, through Dr. Cyrus Edson, Chief Inspector Sanitary Board, New York, in reply to a letter of March 16, 1890, says: "Careful investigation shows only six cases of leprosy in this city at present. Three are in public institutions, and three are isolated in their residences. During the past ten years, we have averaged about six cases present among us at all times."

Dr. Prince A. Morrow states that leprosy has gained a foothold at Salt Lake City, through Mormon converts from the Hawaiian Islands. (New York Medical Journal, July, 1889.) In confirmation, I am informed by Dr. J. M. Benedict of that city, that he has had under his care two Kanaka girls for leprosy. Both are now dead.

I learn that sixteen Chinese lepers have been shipped back home from Oregon within a few years. As to the States, etc., not heretofore mentioned, there is said to be a case of leprosy in (Province Ontario) Canada, also one in Arkansas; one has been reported in Jackson County, Mississippi; one in Indiana, and two or three in Texas. One has been returned to Europe, who desired to land at Boston, Massachusetts. Of deaths within a few years, there have been eight in Iowa, nine in Louisiana, two in Massachusetts, and nineteen in Minnesota.

CASES IN CALIFORNIA.

In California the earliest cases were Chinamen, and up to the present time the great majority have been Chinese. Owing to their migratory habits, it has been impossible to enumerate the lepers correctly. The same individuals might be observed in several different counties, if not promptly apprehended. When sufficiently advanced in the disease to be recognized, they have mostly drifted to San Francisco, and found their way to the Twenty-sixth-Street Hospital (pesthouse). The majority have been sent back to China, as they have this option. Through correspondents in most of the counties, I have been able to learn of twenty cases under their observation during, perhaps, as many years, outside of San Francisco, but some of them might also be reckoned there, after arrival from the country. Six deaths are known to have occurred outside the metropolis, but it is probable that other lepers have died of intercurrent diseases, and so have not been included. The law requires all cases to be reported by the local authorities to the Secretary of State, who is to keep a complete register of them; but no penalty is provided for neglect, and the duty has not been performed.

Most of the white lepers trace their malady to the Hawaiian Islands. I have been informed by Dr. L. L. Dorr, who was Coroner at San Francisco from 1876 to 1881, that two white lepers came under his official notice as suicides. Both had lived on the Hawaiian Islands. He adds that it has been customary there to allow white lepers to leave the country, instead of going to the Molokai Settlement. There are now three white boys, brothers, at the Twenty-sixth-Street Hospital, who contracted leprosy on the Islands. Their father lives in the city, and remains in good health.

I am specially indebted to Dr. W. F. Finnie, Resident Physician of the San Francisco City and County Hospital, for the following particulars, which he has compiled with great pains from the records of the Twenty-sixth-Street Hospital (pesthouse):

TABLE OF LEPERS IN SAN FRANCISCO, 1871-1890.

<i>Year of Admission.</i>			
1871	1	1881	2
1872	1	1882	12
1873	1	1883	11
1874	6	1884	9
1875	9	1885	7
1876	3	1886	6
1877	—	1887	3
1878	13	1888	3
1879	14	1889	12
1880	10	1890	5

<i>Nativity.</i>		<i>Color.</i>	
China	114	Whites	12
Honolulu	1	Mongolians	115
United States	3	Mixed	1
England	1	Total	128
Sweden	1		
France	1		
Japan	1		
Germany	1		
Mexico	1		
Total	128		

<i>Sex.</i>	
Males	120
Females	8
Total	128

TABLE OF LEPERS IN SAN FRANCISCO—Continued.

<i>Last Residence other than San Francisco.</i>		<i>Disposal of Cases.</i>	
San Quentin	1	Discharged	6
Monterey	1	Escaped	3
Honolulu	5	Died	22
Merced	1	Shipped to China	83
Sacramento	3	Not noted	1
New York	3	Remaining April 1, 1890	13
Los Angeles	2		
Petaluma	1	Total	123
St. Louis, Mo.	1		
Napa City	1		
Dutch Flat, Placer County	1		
Total	20		

TABLE OF LEPEES IN SAN FRANCISCO—Continued.

No.	NAME.	Age.	Nativity.	Occupation.	When Admitted.	When Discharged.	Remarks.
1	Hoy Tong.....	32	China.....	July 5, 1871.	Sept. 29, 1875.	Readmitted May 15, 1875.
2	Ah Choy.....	33	China.....	.....	April 26, 1872.	Sept. 12, 1873.
3	Ah Sue.....	37	China.....	.....	April 10, 1873.	Aug. 13, 1875.
4	Ah Foon.....	25	China.....	Cigarmaker	May 13, 1874.	Aug. 31, 1876.	
5	Ah Foy.....	31	China.....	.....	June 2, 1874.	July 28, 1874.
6	Ah Cue.....	26	China.....	Shoemaker	June 18, 1874.	July 9, 1875.	
7	Ah Lin.....	16	China.....	Cook	Nov. 6, 1874.	Aug. 18, 1875.	
8	Ah Yow.....	22	China.....	.....	Dec. 8, 1874.	Aug. 31, 1878.
9	Ah King.....	39	China.....	.....	Dec. 9, 1874.	June 12, 1875.
10	Ah Yin.....	49	China.....	.....	Feb. 3, 1875.	Aug. 31, 1876.
11	Ah Gim.....	25	China.....	.....	Feb. 24, 1875.	May 8, 1876.
12	Ah Yow.....	28	China.....	.....	Mar. 30, 1875.	Aug. 31, 1876.
13	Ah Dew.....	37	China.....	.....	May 15, 1875.	Aug. 31, 1876.
14	Ah Fook.....	25	China.....	.....	May 15, 1875.	Aug. 30, 1875.
15	Gu Fu (No. 5, supra).....	83	China.....	.....	May 17, 1875.	Aug. 31, 1876.
16	Ah Fook.....	31	China.....	Cook	June 6, 1875.	Aug. 31, 1876.	Hanged himself. Escaped from hospital.
17	Ahn Yee.....	42	China.....	Miner	Sept. 23, 1875.	Aug. 31, 1876.	
18	Ah Hoon.....	35	China.....	Shoemaker	Oct. 13, 1875.	Aug. 31, 1876.	
19	Ah Yum.....	26	China.....	.....	Feb. 15, 1876.	May 23, 1876.
20	Ah Loy.....	34	China.....	Cigarmaker	Feb. 18, 1876.	Aug. 31, 1876.	
21	Ah Leung.....	28	China.....	.....	April 13, 1876.	Aug. 31, 1876.
22	Ching Ling.....	24	China.....	.....	July 21, 1876.	June 2, 1879.
23	Nama Boo.....	39	China.....	.....	Oct. 3, 1876.	June 2, 1879.
24	You Gow.....	34	China.....	.....	Oct. 3, 1876.	June 2, 1879.
25	Ah Limb.....	26	China.....	.....	Oct. 3, 1876.	June 2, 1879.
26	Ah Chung.....	28	China.....	.....	Oct. 3, 1876.	June 2, 1879.
27	Ah Ying.....	30	China.....	.....	Oct. 3, 1876.	June 2, 1879.
28	Lee Fond.....	23	China.....	.....	Oct. 3, 1876.	June 2, 1879.
29	Ah Hong.....	25	China.....	.....	Oct. 3, 1876.	June 2, 1879.
30	Ah Tan.....	28	China.....	.....	Oct. 3, 1876.	June 2, 1879.
31	Ah Sam.....	32	China.....	.....	Oct. 3, 1876.	June 2, 1879.
32	Ah Fond.....	26	China.....	.....	Oct. 9, 1878.	June 2, 1879.
33	Tong Wa.....	26	China.....	.....	Nov. 20, 1878.	June 2, 1879.
34	Ah Sin.....	25	China.....	.....	Dec. 8, 1878.	June 2, 1879.
35	Ah Yung.....	36	China.....	.....	Feb. 19, 1879.	June 2, 1879.
36	Ah Wand.....	80	China.....	.....	April 30, 1879.	Sept. 23, 1879.
37	Ah Wan.....	34	China.....	.....	April 30, 1879.	Nov. 20, 1878.
38	Ah Cow.....	25	China.....	.....	June 17, 1879.	Dec. 21, 1880.

39	Sam Sing	China	June 25, 1879	Dec. 21, 1880	
40	Ah Wah	China	June 27, 1879	Nov. 25, 1879	Taken by friends for shipment.
41	Lin Duck	China	July 28, 1879	Mar. 20, 1880	Left hospital.
42	Ah Lay	China	July 28, 1879	Dec. 21, 1880	
43	Ah Chung	China	July 28, 1879	Dec. 21, 1880	
44	Ah Toy	China	July 28, 1879	Dec. 21, 1880	
45	Ah Kee	China	July 28, 1879	Dec. 21, 1880	
46	Ah Kee	China	July 28, 1879	Dec. 21, 1880	
47	Sing Lang	China	Aug. 1, 1879	Dec. 21, 1880	
48	Ah Gong	China	Oct. 2, 1879	Dec. 22, 1880	
49	Ah You	China	Jan. 20, 1880	Dec. 21, 1880	
50	Ah Leon	China	Feb. 17, 1880	Dec. 21, 1880	
51	Lang Goo?	China	Mar. 1, 1880	Dec. 21, 1880	
52	Thomas Stanton	England	Mar. 4, 1880	Nov. 4, 1881	
53	Wan Lung	China	Mar. 8, 1880	Dec. 19, 1880	Shipped by friends on Belgic, Dec. 21, 1880.
54	Ah Chue	China	April 19, 1880	Dec. 19, 1880	Shipped by friends on Belgic, Dec. 21, 1880.
55	Ah Wan	China	April 22, 1880	June 14, 1880	Taken by friends for shipment.
56	Ah Lone	China	May 6, 1880	Dec. 19, 1880	Shipped by friends (Belgic?).
57	Ah Pack?	China	July 7, 1880	Nov. 30, 1880	
58	Ah Sim?	China	Aug. 2, 1880	Nov. 30, 1880	
59	Ye Mug Tou	China	July 14, 1881	Dec. 19, 1880	Shipped by friends (Belgic?).
60	He Hup	China	Dec. 2, 1881	Aug. 7, 1884	Lost use of hands two years before entrance.
61	Ah Sue	China	Mar. 27, 1882	Aug. 7, 1884	Diseased for two years.
62	Ah Chue	China	Mar. 27, 1882	Aug. 7, 1884	
63	Ah Wan	China	Mar. 27, 1882	Aug. 7, 1884	
64	Ah He	China	Mar. 31, 1882	July 15, 1882	Diseased for two years.
65	Ah Sock	China	April 1, 1882	Aug. 7, 1884	Fifteen years in California.
66	Charles Lacy	China	May 8, 1882	May 29, 1883	
67	Ah Shue	China	July 1, 1882	Aug. 7, 1884	
68	Ah Yet	China	July 1, 1882	Sept. 30, 1883	Escaped from hospital.
69	Ah Yick	China	Aug. 20, 1882	Aug. 7, 1884	Suicided by optum.
70	Ah Sing	China	Nov. 6, 1882	Feb. 28, 1883	Admitted with psora-lepra.
71	Ah Chung	China	Nov. 7, 1882	Aug. 7, 1884	
72	Ah Young	China	Nov. 8, 1882	June 22, 1883	
73	Ah Grue	China	Jan. 4, 1883	Aug. 7, 1884	Shipped by friends.
74	Ah Noe	China	Jan. 9, 1883	July 10, 1883	Shipped by friends.
75	Ah Cow	China	Jan. 13, 1883	July 10, 1883	
76	Sing Lah	China	Jan. 19, 1883	Aug. 7, 1884	Shipped by friends.
77	Ah Nay	China	Jan. 13, 1883	July 10, 1883	
78	Che Onne	China	April 30, 1883	Aug. 7, 1884	
79	Marie Nicholas	Honolulu	Sept. 17, 1883	Aug. 7, 1884	
80	Ah Ling	Sweden	Oct. 5, 1883	Aug. 7, 1884	
81	Eric Erickson	Sweden	July 13, 1883	July 15, 1884	Died of smallpox.
82	Hun Yee	Sweden	Nov. 23, 1883	Aug. 7, 1884	
83	Ah Lee	Sweden	Nov. 23, 1883	Aug. 7, 1884	

TABLE OF LEPERS IN SAN FRANCISCO—Continued.

No.	NAME.	Age.	Nativity.	Occupation.	When Admitted.	When Discharged.	Remarks.
84	Ah You.	27		Weaver	Feb. 21, 1894.	Aug. 7, 1894.	
85	Ah Jock	46			Feb. 25, 1894.	Aug. 7, 1894.	Disease of three years' duration.
86	Ah Quin	25			Mar. 31, 1894.	Aug. 7, 1894.	Disease of four years' duration.
87	Nick Horne	37		Gardener	April 27, 1894.	Aug. 7, 1894.	Disease of six months' duration.
88	Ah Ling	36		Hopicker	May 10, 1894.	Aug. 7, 1894.	
89	Ah Yin	37		Laundryman	July 10, 1894.	Aug. 7, 1894.	
90	Ah Shain	30		Cook	July 10, 1894.	Aug. 7, 1894.	
91	Ah Shain	34		Cook	July 23, 1894.	Aug. 7, 1894.	
92	Wong Tick	22		Laundryman	Nov. 11, 1894.	June 27, 1895.	One day from New York.
93	Ah Wong	26		Cook	Jan. 7, 1895.	June 27, 1895.	Four days from Los Angeles.
94	Quong Wah				Jan. 7, 1895.	June 27, 1895.	One day from Petaluma.
95	Loi Young	22			Mar. 7, 1895.	June 27, 1895.	No knowledge of this case.
96	Yee Fo.	24		Merchant	Mar. 31, 1895.	June 27, 1895.	
97	Ah Lui	26		Laborer	April 2, 1895.	July 9, 1895.	
98	Daniel Higgins	64	Connecticut		April 16, 1895.	Mar. 7, 1895.	
99	Long Hong	32		Cigarmaker	Mar. 22, 1895.	June 27, 1895.	
100	Ah Gip.	26			April 8, 1895.	April 12, 1896.	
101	Wong Joe San	43			April 27, 1896.	May 8, 1896.	
102	Edw. T. Bindt	16	Honolulu		May 12, 1896.		Died of peritonitis.
103	Frank Bindt.	17	Honolulu		Aug. 23, 1896.		Still in hospital April 1, 1890.
104	Ernest Bindt.	14	Honolulu		Aug. 23, 1896.		Still in hospital April 1, 1890.
105	Goon How	31		Laundryman	Nov. 5, 1896.	Dec. 1, 1896.	Still in hospital April 1, 1890.
106	Clark F. Blackmer.	39	Massachusetts	Teamster	Feb. 23, 1897.	Aug. 18, 1897.	Escaped; brought back February 27, 1890.
107	Chas. M. Stillwell	56	Philadelphia, Pa.	Laborer	Oct. 13, 1897.	Aug. 7, 1898.	
108	Charley Ah Wee	24			Oct. 14, 1897.	June 1, 1898.	Escaped; brought back November 27, 1899.
109	Tankinchi Yontaka.	28	Japan.		Sept. 23, 1898.	April 12, 1898.	Eight years in California.
110	Young Ah You	37			Sept. 23, 1898.	Oct. 29, 1899.	Tubercles on hands and face.
111	Chung Ah Fook	29			Sept. 23, 1898.	Mar. 2, 1899.	In Arizona three years, Los Angeles five yrs.
112	Ah Hung (No. 1)	35		Coal miner	Jan. 31, 1899.	Oct. 29, 1899.	
113	Ah Gum	36		Housewife	Mar. 15, 1899.	Sept. 26, 1899.	
114	Ah Hin.	56		Laborer	April 19, 1899.	Oct. 2, 1899.	Discharged by Board of Health.
115	Matthew Perrin.	67	France	Tailor	July 2, 1899.	Sept. 5, 1899.	Sent to almshouse by Board of Health.
116	See Tong Tai.	35		Laundryman	Aug. 21, 1899.	Oct. 29, 1899.	
117	Ah Loue	38			Sept. 18, 1899.	Oct. 29, 1899.	
118	Ah Hung (No. 2)	35		Cook	Sept. 25, 1899.	Oct. 29, 1899.	
119	Chin Tun.	26		Cook	Oct. 4, 1899.	Oct. 29, 1899.	
120	Dietrick Hummalback.	41	Germany	Carpenter	Oct. 14, 1899.	Mar. 14, 1899.	Died from pulmonary troubles.
121	Sing Ah Low.	29		Laundryman	Nov. 12, 1899.		
122	Yee Ah Quong.	26			Nov. 27, 1899.		
	Charley Ah Wee	26			Nov. 27, 1899.		See No. 108.

123	Wong Pak Chung	21	Honolulu	Clerk	Dec. 31, 1889	See No. 106.
124	Wm. Horn	27	Honolulu	Cigarmaker	Feb. 13, 1890	
125	Ah Fo	42	Massachusetts	Teamster	Feb. 16, 1890	
126	Clark F. Blackmer	14	Acapulco, Mex.	Rootblack	Feb. 27, 1890	
127	Peter Benada	50		Miner	Mar. 1, 1890	
128	Yee Ah Yeng	23		Ranch cook	Mar. 24, 1890	
129	Cheung Ah Soon				Mar. 26, 1890	

Of those deceased, three were suicides, one died of accidental suffocation, and one of smallpox.

It is curious that the records of the City and County Hospital give, from 1871 to 1876, inclusive, fifty-seven cases of syphilis, with sixteen deaths; while from 1882 to 1890 there were forty cases and no deaths. Dr. Finnie reasonably presumes that all, or nearly all, of the sixteen fatal cases were leprosy.

CASUAL OR SPORADIC CASES.

These occasionally turn up most unexpectedly in places where leprosy has always been unknown or rarely observed. They are a puzzle to the medical men and a wonder to the laity. It is probable that they often pass without recognition, for the great majority of physicians are strangers to the disease and would mistake it for something else. The ordinary sources of medical information furnish the following: In England most of them have previously resided in India or the colonies where leprosy prevails. In 1873 Dr. F. E. Anstie presented a case to the Clinical Society of London, a man twenty-nine years old, who had resided eleven years in India. Three others had previously come under his notice. The same year Dr. Tilbury Fox reported a girl ten years old, who was believed to have contracted leprosy from her wet nurse. The first symptoms appeared when she was between two and three years of age. In 1853 a tailor, native of Ireland, died of leprosy at Guy's Hospital, London, after an illness of eight years. He was never out of the British Isles.—*Med. Chir. Trans.*, 1860.

In 1872 an Irish leper was shown to the Dublin Medical Society, who had contracted the disease in India. For a year and a half this man's brother, who had only left Ireland for a visit to England forty-six years before, slept in the same bed and wore his clothing. He became a leper and was presented to the same society. There were no other lepers in the family.—*Report Dr. Lee in Nat. Conf. S. B. of H.*, 1888.

Cases occasionally present themselves at hospitals in Boston, Philadelphia, Baltimore, and other cities. They are mostly sailors or persons who have lived abroad. A case of leprosy developed in the almshouse of Salem, Massachusetts, in the person of a man named Charles Derby, lately from San Francisco. He had lived some years at Honolulu, as chief botanist to Queen Emma.—*Medical News*, December 23, 1882.

In 1889, Dr. P. S. Abraham presented two cases to the Epidemiological Society of London, one tubercular, the other anæsthetic. The latter was a native of London, sixty-four years old, who had been a sailor in the Mediterranean and Baltic, but for the last forty years had not been out of London. He was a meat salesman. Dr. Abraham thought the period of incubation must have been nearly forty years. He also alluded to a recent case brought to notice in Dublin.

In 1889, Dr. Geo. Dock reported to the Texas State Medical Society two cases of leprosy, of tubercular type, one of eight and the other of five years' standing; one a native of Germany, the other of Alsace; one a harness and mattress maker, the other employed in a cotton press. Both had resided at Galveston more than twenty years, and Dr. Dock was unable to trace the cause either through heredity or contagion.

Professor White, of Boston, states that one of the Tracadie cases escaped about 1857, and was for a considerable time at Boston, under

an assumed name. There he was under the doctor's charge for months, at the Massachusetts General Hospital. A leper from Louisiana, under a feigned name, lived near Boston, and came under his care in 1882. He adds that another Tracadie case has been known at Boston, and one in 1882 was discovered at Providence and returned to Tracadie.

In 1888 a leper, in company with another Chinaman, boarded a train at Ogden. His case was recognized by a physician, who happened to be aboard, and the Division Superintendent of the Central Pacific Railroad was notified; but he refused to have the leper removed from the train, and he was brought to San Francisco.

The State Board of Health of Missouri, in 1889, reported the discovery of a case in June, 1888. He had lived at New Orleans most of the time from 1866 to 1879, and leprosy developed in 1881. He was removed to the quarantine hospital at St. Louis.

In September, 1888, two Chinese lepers traveled from Los Angeles to San Francisco, having been sent by their countrymen without knowledge of the authorities. On arrival at San Francisco they were recognized as lepers and sent to the Twenty-sixth-Street Hospital.*

Late in 1889, two Chinese lepers traveled by rail from New York to San Francisco. One came with a certificate to the Health Officer at San Francisco, that he was affected with leprosy, and a request that "good care be taken of him."†

The Occidental Medical Times of July 1, 1889, gives the case of a leper committed to the Sacramento County Jail, in an advanced stage of leprosy. He was pardoned by the Governor, so that he might be sent to the Twenty-sixth-Street Hospital at San Francisco.

Dr. David Powell, of Marysville, Yuba County, California, kindly reports to me the case of a mulatto barber of that place, aged sixty, who committed suicide in 1888, on discovering himself to be a leper. He was a native of Virginia, and had not been away from Marysville for twenty-five years. Symptoms of leprosy appeared in 1884, but he continued to work at his trade long after. Dr. C. E. Stone, President of the local Board of Health, surmises that he might have contracted the disease from Chinese women.

Dr. F. B. Sutliff, of Sacramento, informed me about a year ago that three cases of leprosy had come under his personal observation in his own community, all of the tubercular type and all at large.

Dr. J. L. Babcock (N. Y. Med. Rec., Sept., 1888) states that three cases occurred at St. Louis in 1888.

In May, 1888, I, myself, saw a young man on the streets of Los Angeles, who presented the appearance of a leper, but there was no opportunity for thorough examination.

The writer of an article in the editorial pages of the Pacific Medical and Surgical Journal, for August, 1888, states that he saw a Chinaman on the street in the Chinese quarter of San Francisco, a few months previously, who was obviously a leper, but not in a very advanced stage. In the month of February, 1890, no less than three lepers, all white men, have been apprehended in San Francisco and sent to the Twenty-sixth-Street Hospital. One, a teamster, forty-one years old, has been affected

* Ah Lone and Chung Ah Fook, two of the five shown in cut, taken in San Francisco, March, 1890.

† I have photographs of about fifty cases of leprosy, mostly Chinese, all of which are supposed to have originated or resided in California.



AH HUNG, No. 2.

SEE TONG TAI.

CHUNG AH FOOK.

AH LOUE.

AH HUNG, No. 1.

CHUNG AH FOOK.—Age, 29; admitted into hospital, September 26, 1888. Eighteen years in California at Sissons, then two years each at Ing-rams and Los Angeles. Tubercles on hand and face; paraphlegic; denies anæsthesia. Sick three years.

AH LOUE.—Age, 38; admitted, September 18, 1888. Cutaneous and subcutaneous infiltration of tissues of face, especially of eyebrows, lids, and malar prominences (a mild leontiasis); no ulcerations; no distinct tubercles; hands characteristically puffed; anæsthesia probable, but not noted. Denies having lived in Los Angeles, but admits having lived in Arizona and Colorado. This Chinaman undoubtedly lived in Los Angeles, but like many of his race "evades the truth."

AH HUNG, No. 1.—Age, 35; coal miner; admitted, January 31, 1889. A characteristically tubercular case, no infiltrated areas, no maculæ, no anæsthesia—purely tubercular.

SEE TONG TAI.—Age, 35; smooth shining infiltration of tissues of face; maculæ—atrophy of orbicularis palpebrarum of both eyes—anæsthesia; no tubercles.

AH HUNG, No. 2.—Age, 35; cook; last residence, Napa City; disease of four years' standing. Origin, first a spot on face (maculæ); then a tubercle, this disappeared then reappeared. Face and hands tuberculated, infiltrated, and fissured.

All these five cases were shipped to China on steamer "City of Pekin," October 29, 1889.

The above cases, with their names, histories, etc., have been kindly furnished me by Dr. W. F. Finnie, 229 Geary Street, formerly Resident Physician, City and County Hospital, San Francisco.

seven years, and has been twice at the hospital before, but escaped. Another, now twenty-one years old, lived for some years at Honolulu, and has been affected several years. The third, a native of Guatemala, fourteen years old, and one year a resident of San Francisco, employed as a dishwasher at various restaurants. He has been a leper for three years.

CAUSES DETERMINING LEPROSY.

Twenty years ago, writers on this subject were much inclined to ascribe the disease to endemic causes, such as proximity to the seacoast, low altitudes above sea level, high temperature, excessive moisture in the atmosphere, etc. It is found, however, that the malady prevails where all these conditions are absent. A fish diet has been accused by many writers of being the cause, but the Hindoos of the interior rarely eat fish. In India, it has been attributed to deficiency of salt in food, because the poorest people at the same time abstain most from taxed salt and furnish most cases of the malady. Elsewhere no one has thought of this as a cause. It is true that leprosy attaches most to people lowest in the scale of intelligence, of wealth, and of the comforts of life. Such people live most crowded in their habitations, particularly in their beds, and eat with their fingers from a common dish. They have too little clothing to allow frequent changes and clean attire, soap is little used, and personal cleanliness neglected. All these conditions favor contagion, and it is found that contrary conditions are attended with proportional exemption from the disease. The improved condition of Norwegian immigrants in this country, rather than any difference in the climate, has resulted in the moderation and gradual disappearance of leprosy.

Until ten or fifteen years ago most writers of the present age regarded heredity as the chief factor in the production of this disease, and many still adhere to the belief. It is, however, rapidly losing ground, and there are some who are disposed to estimate it of little or no force. Inasmuch as at least a majority of the children of lepers fail to take the disorder, all must admit that the influence is weak. What becomes of heredity among the children of Norwegian immigrants in the States of Wisconsin, Iowa, and Minnesota? Two hundred lepers in the first generation afford only one in the second generation during fifty years.

Dr. White states that in 1848, eleven inmates of the Tracadie Asylum had altogether sixty-three children, none of whom were diseased. On the other hand, the rapid spread of leprosy in the Sandwich Islands between 1860 and 1875 makes it impossible that any considerable proportion could have inherited the taint. Aside from the mortality due to this malady, the native population there is rapidly diminishing, and it is found that lepers have few children, most of whom are either born dead or die young.

According to Dr. G. L. Fitch, who lived several years at the islands, and who must have had abundant means of observation, of twenty-six children born at the Molokai Settlement of parents one or both leprous, and aged from twenty-one months to fourteen years, only two were lepers in 1884; but Dr. Mouritz, two years later, found nine lepers among them. Contagion was doing its work. The group of sixteen cases at Charleston could not be accounted for by heredity, for the Jews belonged to three different families, and there were besides Irish, native whites, and blacks; neither did heredity succeed in perpetuating the

disorder. In only a very small number of the forty-two cases now at New Orleans does Dr. Blanc succeed in finding lepers among their relatives, either as antecedents or descendants. Of course, it is out of the question that heredity could have played any part among the white lepers of the Sandwich Islands, of whom sixteen had been sent to the leper settlement previous to 1880.

• The advocates of heredity agree that it is much stronger in the maternal than the paternal line, but offer no explanation. It is evident that children are in far closer social relation with the mother than with the father, especially during the first eighteen months of life, so that the chance for contagion would operate in the same degree. Instances are given of skipping over one generation in hereditary transmission. It often happens that children are special favorites of grand-parents, and are in closer relation with them than with their parents. It would be interesting to note whether atavism in leprosy could actually be explained in this way. In my judgment it is quite easy to account for the cases that occur in the same family otherwise than by inheritance, for there are more opportunities for contagion in the same household than elsewhere. Therefore, without totally rejecting the influence of heredity, I should say that, in our present knowledge, it is not necessary to invoke it. The real test would be to remove immediately after birth a number of children from leprous parents, and strictly guard them against contagion. Then if any of them should become lepers, there would be satisfactory evidence of inheritance. Such a test has not yet been afforded, but it may soon be supplied in the Kapiolani Home, devoted to the care of girls, the children of lepers not yet confirmed as lepers themselves, and other suspects of the disease, which was opened in the Hawaiian Islands in November, 1885.

The notion that leprosy is an offshoot, or form, or stage, of syphilis, probably originated in India, where it is entertained by many native and a few European physicians.

So far as I learn, only two medical men who have lived on the Sandwich Islands hold this opinion, namely: Drs. Geo. L. Fitch and F. H. Enders, and the latter is by no means positive. Dr. Fitch's theory of leprosy is thus enunciated (*Pacif. Med. and Surg. Jour.*, Oct., 1885): "I believe myself to be fully justified in saying that leprosy is a disease which cannot be communicated from a leper to any other person, by, through, or under any combination of circumstances, except heredity; and that even this plays but little part in the propagation of the disease, we may know from the fact that from 1866, when Kalawao Settlement was founded, until March 1, 1884, two thousand nine hundred and forty-one lepers were consigned there, and up to October 9, 1884, only twenty-six children born in the settlement were alive, where either parent was a leper before the birth of the child. * * * Suffice it to say, that I fully believe leprosy to be a fourth stage of syphilis, or form of scrofula subsequent to syphilis, occurring but rarely except in a virgin race, or contracted from a member of such race; and then only in persons of broken down or cachectic, nervous constitution, and rarely met with among Anglo-Saxon or Celtic races, except in blondes." *Per contra*, Drs. Arning and Emerson aver that persons contract leprosy whose parents were free from it, and who have never had syphilis. It would be violence to all probability to suppose that the leprosy of Fathers Damien and Gregory, of the Hawaiian Islands, and of Father Bogliori,

of New Orleans, who became diseased while in discharge of their sacred functions, was due to syphilis, either inherited or acquired.

This theory of the identity or relationship of the two maladies must have arisen, both in India (where Surgeon-General Moore holds that view) and the Islands, from their joint prevalence in those countries, and their associations in many individuals. Dr. Fitch lays great stress upon his failure to syphilize several lepers by inoculation with syphilitic virus. This is explained by their being already syphilitic, as the majority of the natives of the islands are said to be.

Let us now note the history of the two diseases. Leprosy has prevailed in the Old World from time immemorial. Constitutional syphilis is not known to have existed in the Eastern Hemisphere before the discovery of the New World by Columbus; but it is certain that within a few years after it seized on all classes of people in Italy and Spain, and rapidly spread over Europe. It was a terrible stranger, and its ravages, both in extent and severity, were like those of smallpox among the American aborigines, and leprosy among the Hawaiians. There is abundant mention of venereal sores and gonorrhœa in ancient literature, but nothing like constitutional syphilis was described till within ten years of the close of the fifteenth century, or after the first visit of Columbus to America.

On the other hand, there is no proof that leprosy existed among the aborigines of America before 1492. Again, it is said that syphilis has long been prevalent in Kamtchatka, but leprosy is not.

Dr. M. Hagan, of Los Angeles, who formerly resided in the Sandwich Islands, and is good authority in regard to the disease, says: "It has been settled beyond dispute that a leper will contract syphilis and recover from it with proper treatment, while the original disease goes on and ends in death." At least 95 per cent of syphilitic cases can be thoroughly cured by proper treatment sufficiently prolonged, but the remedies which control it are powerless in leprosy. On the other hand, the remedies which stay the progress of leprosy have gained no success in syphilis. The heredity of uncured syphilis is undisputed, and generally apparent at birth; that of leprosy, if real, never appears till there has been opportunity for contagion and a sufficient period of incubation.

As to the contagiousness of leprosy, there is abundance of evidence that this was the accepted and general belief of former ages. The Hebrew segregation of lepers proves it. Their collections in hospitals throughout Europe in the middle ages, and their being obliged, when outside, to wear a peculiar garb, and warn other persons of their presence by ringing a small bell, have the same significance. In the present age so few cases are found in the civilized world, and the latent period is so much longer than in all other contagious maladies, except possibly hydrophobia, that some other cause is sought and found, which satisfies those who forget the opinions and practices of former ages when there were more opportunities for observation.

In 1867, the Royal College of Physicians of London, published their famous opinion in opposition to the contagiousness of leprosy, on hearsay evidence, which opinion has governed the action of the British Government ever since, and has exerted a world-wide influence.

In the discussion before the French Academy of Medicine in 1885, only three French physicians held the doctrine of contagion; but in 1888

the number was much larger. (Dr. P. A. Morrow, N. Y. Med. J., July 29, 1889.) It is encouraging to note that the Committee on Leprosy of the Royal College of Physicians has recently recommended another investigation of the subject.

In China and India leprosy prevails as of old, where repression has never been tried effectually. In Europe the plan of segregation during the thirteenth, fourteenth, and fifteenth centuries nearly eradicated the malady. For want of such repression leprosy is now increasing in most of the British colonies. New Brunswick is a notable exception. Dr. Hansen remarks: "I have met with families of which only those members became leprosy that had emigrated to places where leprosy prevailed. The members that remained at home did not catch the disease." With due regard to cleanliness and avoidance of all secretions and exudations from lepers he thinks there is no danger.

Proofs of communication through contagion are innumerable. There is no other way to account for the rapid spread of leprosy in the Hawaiian Islands, and especially its contraction by a few white residents. For example, Dr. A. W. Saxe, in a paper read to the California State Medical Society in 1881, gave an instance of three children of American parents, who remained healthy, having become lepers at Honolulu. Their mother did not nurse them, and they evidently were somewhat inoculated by a native wet nurse or some leprosy playmate. The supposition that the disease existed among the indigenous Mexicans is probably a mistake, for the aboriginal race are free of it, except where they have lived in close relations with the whites or negroes, as in those regions settled by the Spaniards and Portuguese. It is much more likely that American leprosy was derived from Europe and Africa. Not heredity, nor syphilis, nor endemic conditions could have given rise to the group of sixty cases in the village of Spain, to the outbreaks in New Brunswick and Cape Breton Island, to the sixteen cases at Charleston between 1846 and 1876, to the forty-two now at New Orleans, or to the two at Galveston. It is often impossible to trace the source and mode of contagion, but the same is true with all the disorders whose contagiousness is undisputed.

Besides, we have the evidence of inoculation, which is incontrovertible. Dr. Fitch gives some instances of failure, and adduces the convict Keanu, who was inoculated at the Sandwich Islands by Dr. Arning, in 1884, as an alternative to the death penalty; but the man died of leprosy since Dr. Fitch wrote, and some of his other instances may result in like manner.*

Dr. J. C. Tache, of Canada, relates the following: "At the funeral of one of the first lepers at Tracadie, a young man who helped to carry the coffin on his shoulder received an abrasion of the skin from its sharp edge. There was a flow of liquid from the coffin, which wet the abraded spot, and he had no opportunity for several hours to change his clothing or cleanse himself. He had no hereditary taint, but died a leper within a few years."

Dr. A. C. Smith, of Newcastle, N. B., relates the case of a boy now far advanced in leprosy, who at three years of age was waited on by a lep-

* As to Keanu, Dr. Arning supposed that there had been no leprosy previously in his family; but Dr. S. B. Swift, resident physician at the Molokai Settlement, avers that this man's son and sister's son were both lepers before his inoculation. (*Occidental Med. Times*, April, 1890.) Consequently, it is possible that Keanu may have contracted leprosy in the natural way; though the bacilli were found at the point of inoculation for more than a year afterwards.

rous woman, while he was in the healing stage of a burn. There had been no leprosy in his family. Dr. Hansen, surgeon to the leper hospital at Bergen, has published some cases where inoculation had taken place. Dr. Saxe gives the case of a physician's son who acquired the disease after inserting a pin into his leg, which a little Hawaiian leper had just previously thrust into an anæsthetic patch on his own leg. (Prof. White, *Am. Jour. M. S.*, October, 1882.) Dr. Hillebrand relates this occurrence in Borneo: A colored leprous boy ran a knife into an anæsthetic part of his body. His white playmate then ran the same knife into his own flesh. The white boy went to Europe, and nineteen years after developed leprosy. It has been suggested that leprosy might be inoculated by the bites of flies and mosquitoes coming from leprous sores; and it is supposed by Dr. Manson that Elephantiasis Arabum is communicated in this way. The supposition is certainly more probable with the former than the latter, and might account for some mysterious cases.

It is important to make a distinction between contagion and infection. Unfortunately, there is a want of precision in their definitions, and great confusion in the use of the terms. Here I would suggest that we understand contagion to mean the reception of a disease poison through some solution of continuity, and infection its absorption through an unbroken surface. Contagion would, therefore, mostly operate by immediate application of virulent matter to an external abraded spot; and infection commonly be produced on respiratory surfaces through the medium of the atmosphere. The same distinction would apply to microbes in the alimentary canal, and on the genito-urinary parts. It follows, therefore, that infectious diseases only are liable to become epidemic. In this sense leprosy would be contagious but not infectious, since it is probably necessary for the virus to come in contact with an exposed capillary surface in order to be absorbed. This is indicated by the safety of persons casually meeting lepers, and it explains the fact that individuals have lived in intimate relations with lepers for years without harm. Proof of the absolute non-contagiousness of leprosy is claimed from the well known and numerous instances of escape during many years of married life between lepers and non-lepers. Safety is attributable to a sound skin, or failure to apply the virus to an absorbing surface. The contagiousness of syphilis is never questioned, but it is probably not communicated through a sound mucous surface, for many incontinent men have always escaped it. The explanation that sexual relations with lepers is less dangerous than with syphilitics, is the fact that leprosy is not apt to attack the generative organs.

The period of incubation is probably rather indefinite. Most writers say from five to ten years, but it is often less. In the case of the man inoculated by Dr. Arning, there were manifest symptoms of leprosy within three years, and the young man mentioned by Dr. Tache began to complain within a year, but lived about eleven years. It is not improbable that there was a mistake in the period of incubation given for the first communication of the malady at the little village in Spain, previously mentioned as only a few months; it might have been longer. Dr. Hansen mentions the case of a Hollander who became a leper ten years after his return from the West Indies. I have already mentioned a case in this paper, in which the latent period was supposed to be forty years, but this seems incredible.

As to sex, the common opinion is that males are considerably in excess of females. This is probably correct, though females in the seclusion of home would be more apt to escape observation. But it is plain that men and boys, being more away from home, in all sorts of company, would be exposed to contagion. With heredity as the prevailing cause, there should be no such marked sexual selection.

It is agreed that the majority of cases begin between the ages of fifteen and forty years, which is the period of greatest activity and exposure. Under three years of age it is extremely rare. Dr. Fitch has not known a case before the commencement of second dentition, but Arning in the Sandwich Islands, and Kynsey in Ceylon, have seen it at three years.

Dr. Torrens has observed it in infancy in the Canary Islands, but the precise age is not given. We may safely conclude that there is always time for a reasonable incubation after exposure.

The natural duration of leprosy varies with the type and circumstances influencing progress. Lewis and Cunningham give the average duration of the tubercular form in India as six years shorter than that of the anæsthetic, and fourteen years for cases in general. Dr. Graham (Wood's Handbook) states that leprosy usually proves fatal in seven or eight years. Danielson and Boeck, of Norway, give the average duration as eight or nine years for the tubercular type, and eighteen or nineteen for the anæsthetic, but sometimes prolonged to forty years. Dr. Arning, in 1884, gave the duration from five to ten years, but Dr. Hillebrand, whose experience in the Islands dated fifteen years earlier, put it at three to five years. It is always understood that cases of mixed type have a progress slower than the tubercular and faster than the anæsthetic.

The circumstances modifying leprosy are numerous and varying in effect. Any causes which lower the standard of health, like previous sickness, deficiency or bad quality of food, exposure to bad weather, excessive exertion, sexual excesses, intemperance, living in close and crowded apartments, deficiency of clothing for change, neglect of ablutions, all favor both the contraction and rapid progress of the disorder. Improvement in all these respects accounts for the development of few cases among Norwegian immigrants, and, with a single exception, of the exemption of their progeny in the United States.

Admitting the contagiousness of leprosy, it is possible that it varies greatly in degree among different individuals and races, as is true of other diseases. Dr. Mouritz concludes that about 18 per cent of the Islanders resist contagion totally, judging from his experience at the Molokai Settlement. It is doubtful whether 1 per cent would resist intentional inoculation. Where the disease has prevailed for thousands of years, as in Egypt, India, and China, and where the anæsthetic is the prevailing type, the principle of natural selection and survival of the fittest would gradually increase the resistance of the people, and in time those races might become exempt. In the absence of effective repressive measures, the population must otherwise have greatly diminished. The same seasoning for ages of the natives of those countries likewise explains the protracted course of the disorder. Without such acquired resistance, and in the absence of repressive measures, its ravages would equal what was experienced in Europe in the twelfth, thirteenth, and fourteenth centuries.

Without apprehending a high degree of contagiousness for leprosy, or

great risk in ordinary intercourse, it is clear that serious danger often lurks in unexpected quarters. Two priests and one physician, Dr. Edward Hoffman, undoubtedly contracted it on the Islands while pursuing their ordinary avocations; also a priest at New Orleans. What might have happened—indeed may already have been incurred here in California—from the Marysville barber who continued to shave men's faces for years after he became a leper; from the San Francisco teamster who escaped and pursued his regular business for more than two years; from a far advanced case lately found in a Chinese laundry at Sacramento; from an escaped leper supposed now to be engaged in fishing in the river; from two Chinese cooks and a Mexican dishwasher sent to the San Francisco pesthouse within the past year? Probably not one of these individuals could point out the particular source of his own taint; more than possible other mysterious cases may follow them, like lengthened shadows to a hopeless doom. In fact, an instance has actually occurred in California of a white boy, now a leper, whose father has employed Chinese both on his ranch and in his house, some of whom are said to have had a cutaneous disorder.

BACILLUS LEPRÆ.

The credit of first discovery is given to Hansen, of Bergen, of date varying from 1869 to 1874, according to different writers.

In 1879 Neisser announced an independent discovery. The latter has inoculated rabbits and dogs with leprous matter, and so produced inflammatory nodes corresponding to human leprosy. He supposes that the spores enter the system and develop wherever they find a suitable nidus, especially in the lymphatic glands. Thence they invade the entire body. Eichhorst states that artificial inoculation of animals has failed, and this has been Arning's experience in the Hawaiian Islands. Neisser, Damsch, and Vossius have succeeded in the culture of the bacilli at the infected spot. The bacilli are found in the skin, mucous membranes, peripheral nerves, lymph glands, testis, liver, spleen, and eyes; also in the blood, usually inclosed in white blood corpuscles. From the annual of Universal Medical Science for 1888 (Sajous), I condense the following: The bacilli lepræ have never yet been found in the blood. When introduced into the circulation these organisms probably are rapidly carried to the capillaries, and thence by diapedesis to lymph spaces, where they set up the characteristic changes. Lymph may contain the bacilli; glandular secretions, notably the urine, are almost entirely free. Tears, the nasal secretion, and the saliva swarm with them whenever the ocular, nasal, or bucco pharyngeal surfaces are lepromatous; also the alvine discharges in leprous diarrhoea. When the testes are involved the semen contains bacilli. The uterine mucus and vaginal secretions never do. Vaccinal lymph from lepers contains them. Leprosy may almost certainly be conveyed from venereal sores. The lymphatics and ganglia are characteristic and constant foci of the bacilli. The central nervous system is not affected by leprosy, as it is by syphilis. There are two methods of conveying disease through bacteria: 1. By direct contact, or inoculation; 2. Indirectly, through soil, air, water, or food. Arning has succeeded with the former mode, but failed with the latter, in his experiments

with leprosy. (This indicates that leprosy is contagious, but not infectious.)

Dr. Edw. E. Arning, by invitation of the Hawaiian Government, pursued the study of leprosy in the islands from 1883 to 1885. The following is a brief abstract of his observations in its bacteriology. He found bacilli in the trunks of nerves supplying anæsthetic patches, but not in the patches themselves, nor in chronic sores resulting therefrom. No bacilli in blood or urine. They were found in the nodules of the tubercular form. Culture experiments failed to reproduce bacilli. Inoculation failed to prove the disease in the lower animals. (It had failed in the convict Keanu up to the date of his departure. The animals should have been kept under observation at least three years.) He considers leprosy peculiar to mankind, and transmissible from one person to another directly through the bacilli, or through the intermediate stage of spores. Arning found bacillus lepræ in leprous corpses, even after the appearance of bacteria of putrefaction, but could not aver that they were alive. Bacilli are not found in the red maculæ of the face, which usher in many cases. Excisions from the point of inoculation of Keanu showed bacilli under microscope for fourteen months, but in diminishing numbers. After vaccination of lepers, he found bacillus lepræ in the lymph and crusts.

Dr. Prince A. Morrow (N. Y. Med. Jour., July 27, 1889) states that he failed to find bacillus lepræ in any part of a stillborn child at full term. (Repeated observations would throw light on the heredity of leprosy, and no opportunity should be lost.)

Dr. J. H. Stallard, of San Francisco, has kindly given me a report of his studies in the bacteriology of leprosy, and slides prepared by himself for microscopic observations. He finds that the bacilli persist in water and other fluids, notwithstanding the presence of putrefactive bacteria, for at least eighteen months. As they are motionless, and inoculation is inadmissible, we have no positive evidence of activity; but the slides show that the bacilli continue in every possible form, as spores, more or less aggregated; as bacilli, of various lengths and diameter; plain or beaded, single, or in closely woven zoöglæ. His experiments indicated water to be the vehicle of contagion. After immersion of leprous tissue in absolute alcohol for over a year, he found that subsequent treatment with water would not remove the bacilli, though they could still be seen in situ.

Dr. J. E. Graham (Wood's Reference Handbook) remarks: "It is probable that the spores or bacilli themselves find their way into the body through some lesion in the epithelium, and thus by their growth the system is affected. Nodules and infiltrations are thus the result of specific irritation, due to presence of bacilli."

The mechanical action of these microbes seems to me a correct supposition. Their growth and pressure on blood vessels and nerves satisfactorily explains the mutilations and anæsthesia, and pressure on solid tissues accounts for the ulcerations characteristic of the disorder.

The morphological resemblance of the bacilli of leprosy to those of tuberculosis has been observed by bacteriologists; likewise the slow growth of both microbes. The analogies in the natural history of the two disorders are equally striking; their slow progress, their frequent arrest and occasional retrogression; the usual relapse and fatal termination, unless anticipated by a fatal intercurrent attack of another disease;

the prolonged period of incubation; and probably in both cases a necessary solution of continuity for admission of the microbes to the internal organism. Moreover, it may be found, in time, that heredity figures about as much in one as in the other.

The uniform presence of the bacilli in lepers, whenever looked for, and their absence from non-leprous subjects, demonstrate their connection with the disease. Successful inoculation demonstrates their causative agency and its contagiousness. Even without the evidence of specific bacteria, proofs of the communicability of leprosy are, in my judgment, satisfactory; with it there is no escape. It is improbable that these microbes should find access through sound mucous surfaces of the respiratory or alimentary tract, for then the disease would be infectious, like measles and typhoid fever, and vastly more prevalent. It is apparent, however, that individuals affected with lesions of any tract, whether external or internal, accessible to the air or to food or drink, might offer an avenue to leprous matter, either in the moist or pulverulent state. The morbid intestinal discharges and external ulcerations of lepers are known to abound in the specific bacilli, and are doubtless the general source of contagion. Who knows the antecedents of old rags, of the cast-off clothing that goes to the shoddy factory, of the second-hand clothing which many people handle and wear? The persistency of leprous bacilli has been demonstrated. Such considerations give a credible explanation of some mysterious cases, and a warning of danger lurking at unexpected moments.

THE CONTROL OF LEPROSY.

This subject naturally falls under two heads: (a) curative; (b) preventive.

It is not my intention to make even the most superficial review of the various remedies and modes of treatment in this malady, but only to notice a few agents lately approved. Dr. Arning found that the use of ointments having 10 per cent strength of salicylic and pyrogallie acids destroyed the tubercles, softened the infiltrations, and sometimes restored sensibility to anæsthetic patches. Salicylic acid was tried, also, internally, with apparent benefit. Hypodermic injections of corrosive sublimate, one hundred and sixty in the course of two years, were followed by amendment in one case; in another eighty injections were followed by retarded rate of progress. He found electricity beneficial to the anæsthesia. Potassium iodide failed of good results. With apparent improvement from certain agents, as above, he does not claim lasting cures. Dr. C. J. Peters, of Bombay, has used the following course:

1. Carbolie oil (one in forty) is rubbed over the whole body, to promote healthy action of the skin. This is followed by soap and water ablution.
2. To the ulcerated spots an emulsion of gurgin oil and lime water (one in three) is applied by friction, or on cotton with a bandage.
3. To the anæsthetic patches and tubercular growths cashewnut oil is applied with a brush or feather.
4. Internally, five-minim doses of Chaulmoogra oil with five grains of sodium bicarbonate in one ounce of peppermint water are given. In some cases three-grain doses of potassium iodide. The results obtained

were healing of ulcers, dispersion of tubercles, restoration of sensibility, and relaxation of contractions.

5. The general testimony, however, is to the effect that any mode of treatment is in the end disappointing. Arrest of progress is only temporary, being usually followed by suspension of treatment. Indeed, it is not certain that long perseverance would be attended by permanent relief. At the Tracadie Hospital patients have been discharged apparently cured, but they generally returned to die. The results are even less encouraging than in the treatment of pulmonary consumption. Doubtless some have improved enough to be discharged; have gone out and died of other diseases, and have been considered cured of their leprosy; but there is no proof, and it is rather probable that in time it would have returned. The health authorities of the Hawaiian Islands consider leprosy practically incurable, though they acknowledge that life may be prolonged by certain medical treatment, by good food, and by favorable sanitary conditions.

6. Since, then, so little is to be expected of curative treatment, there is no question of the necessity of rigorous preventive measures. In the earliest stages recognition of the disease is difficult and generally impracticable, but then the danger is small. As soon as a diagnosis can be reached without risk of making a mistake, there should be no hesitation or failure about enforcing segregation. Long ago the people of California recognized the danger of planting leprosy on this coast through Chinese immigration, and for more than fifteen years legislation gave abundant authority for its exclusion and repression. Section 2952 of the Political Code reads as follows: "It shall not be lawful for lepers or persons affected with leprosy, or elephantiasis, to live in ordinary intercourse with the population of this State; but all persons shall be compelled to inhabit such lazarettos, or lepers' quarters, as may be assigned to them by the Board of Supervisors of the city or county in which they shall be domiciled or settled; and the Boards of Supervisors are vested with power and are required to make all necessary provisions for the separation, detention, and care of lepers or persons affected with leprosy, or elephantiasis, settled or domiciled in their respective cities or counties. The Superintendent or manager of all lepers' quarters under this chapter shall forward quarterly statements, showing the name, age, sex, and birth-place of each leper in such quarters, to the Secretary of State, who shall keep a proper record of such matters for the information of the public."

Section 2955 provides for the inspection of all persons arriving in California from foreign ports by the Commissioner of Immigration; those found to be lepers are to be taken in charge by him and placed in a suitable lazaretto, furnished by the Supervisors whenever necessary, and there detained separate from the general population so long as they shall elect to remain in the State, or until they have recovered; but they are allowed to return whence they came. The master or consignee of the vessel bringing lepers is liable to a penalty of \$1,000 for failing or refusing to comply with the law.

In 1883, the Board of Supervisors of San Francisco supplemented the above Act by an order which forbids positively the landing of lepers from any ship, their transfer to another vessel, and their harboring by any person outside the lazaretto. Captains of vessels are required to

report all such cases on arrival. Penalty, fine not less than \$500, or imprisonment not less than six months for any violation.

There is ample legislation in California to deal effectually with leprosy, but I regret to find the health authorities in some towns lax about enforcement. Such has been the recent experience at Sacramento, and some time ago at Los Angeles. I find, also, that there is no record of lepers in the office of the Secretary of State, as the law requires.

California is far in advance of the other States of the Union in laws for the control of leprosy. In Oregon, Health Officers appointed by the Governor for the ports of Astoria, Coos Bay, and Gardiner, are required to board all vessels arriving by sea and to examine passengers and crews for such contagious diseases as smallpox, cholera, and leprosy. This Act provides for no lazaretto, or express disposal of lepers. The Board of Health of New York City is empowered to send to the Marine Hospital any person, not a resident of the city, affected with a malignant or dangerous contagious fever, and there detain him at their pleasure. The provisions of this chapter extend to all diseases which, in the opinion of the Board, shall be dangerous to the public health. Residents of the city may be isolated and guarded at their homes, and the Board may exercise all such other powers, whenever a contagious disease shall appear in the city, as in their judgment the circumstances of the case and the public good may require. Thus it appears that their general powers might be construed to include leprosy, but so far this has not been done. In Massachusetts, Boards of Health have power to isolate and provide necessary attention to persons affected with plague or other sickness dangerous to the public health, either by removal to another house or by removal of other persons from the domicile; and I am informed that latterly lepers have been kept separate from other people.

The Federal Government, having had its attention called to the urgent need of action, has already taken measures for the exclusion of lepers from foreign countries, as the following shows:

CIRCULAR.

Regulation to prevent the introduction of leprosy.

TREASURY DEPARTMENT, OFFICE SUPERVISING SURGEON-GENERAL, M. H. S.,
WASHINGTON, D. C., December 23, 1889.

To Medical Officers of the Marine Hospital Service, Collectors of Customs, and others concerned:

The national quarantine Act, approved April 29, 1878, entitled "An Act to prevent the introduction of contagious or infectious diseases," provides that no vessel or vehicle coming from any foreign port or country where any contagious or infectious disease exists, or any vessel or vehicle conveying persons or animals affected with any contagious disease, shall enter any port of the United States, or cross the boundary line between the United States and any foreign country, except in such manner as may be prescribed.

Attention is now directed to the increased prevalence of the contagious disease known as leprosy in several foreign countries, and the danger of its increase in the United States through the immigration of persons affected with leprosy, and by direction of the Secretary of the Treasury the following regulation, as framed under authority of the foregoing Act, subject to the approval of the President, to protect the people of the United States from the introduction of leprosy:

1. Until further orders, no vessel shall be admitted to entry by the officer of the customs until the master, owner, or authorized agent of the vessel shall produce a certificate from the Health Officer or Quarantine Officer at the port of entry, or nearest United States Quarantine Officer, that no person affected with leprosy was on board the said vessel when admitted to free pratique, or in case a leper was found on board such vessel, that he or she, with baggage, has been removed from the vessel and detained at the quarantine station.

2. Medical officers in command of United States quarantines are hereby instructed to detain any person affected with leprosy found on board any vessel, but such officer will permit the departure on outgoing vessels of persons detained at quarantine in pursuance

of this regulation, provided such vessel shall be bound to the foreign country from which the said leper shall have last sailed.

JOHN B. HAMILTON,
Supervising Surgeon-General, Marine Hospital Service.

Approved: WILLIAM WINDOM, Secretary.

Approved: BENJ. HARRISON.

Inasmuch as the control of leprosy, within the national borders, belongs to the separate States, it is highly desirable that they should enact substantially uniform laws. The subject is a suitable one for the consideration and action of the Conference of State Boards of Health, and this body could frame a bill suitable as a model for all the States. It would then be the duty of each State Board of Health to procure the passage of an Act for that purpose.

This part of the subject would be incomplete without noting some necessary precautions in disposing of leprous corpses. Bacteriologists have shown that the bacilli of leprosy, unlike many others, withstand the action of the bacteria of putrefaction. We know that the soil is poisoned for many years by the bacilli of anthrax, for the rapid contagiousness of the disease has proved it. The contagion of leprosy is so slow, that proof may never be made satisfactory how long the virus persists; but danger is to be apprehended, and it is easy to obviate it. The law should direct some effective method or methods of disinfection. Cremation would certainly be effectual, but could not be made compulsory in the nineteenth century. Whoever lives to the second half of the twentieth century, will probably witness the cremation of bodies dead of dangerous diseases. For the present we might be content with burial in quick lime, and might perhaps obtain legal authority to enforce it.

The full extent of this fearful malady no one knows. Few writers name even half the countries where it may be found. Though the civilized world has substantially won the victory, the enemy returns casually and carries off one or more victims from the best regulated communities. In all four quarters of the globe it retains a foothold. In its ancient seats of Asia and Africa, it holds undisputed sway, almost, without exception, stationary, or perhaps slowly declining, because the races are growing resistant by survival of the fittest. In Europe it has a stronghold in Norway, from which it may be dislodged and perhaps quite expelled within half a century. It holds ill-defined territory in Southern and Central America, the West Indies, and Mexico, and a small tract in British America. In Australasia it is occupying new territory.* In the Sandwich Islands there is a struggle for life between the newly civilized people and the destroyer. In our own country the portions once dominated by the Spaniards have had the earliest and the latest experience, even to the present hour. South Carolina has not escaped; Wisconsin, Iowa, and Minnesota have received it with Norwegian settlers, Utah with Mormon converts, and the Pacific States with Chinese. New York City is seldom without specimens, brought in ships from queer ports in foreign lands, and the other commercial cities are frequently startled with strange visitors. Occasionally, as at Charleston

* The President of the Board of Health for New South Wales reports at present twelve cases in Sydney—ten Chinamen, one Japanese, and one Englishman. Thus it is clearly, as in so many other places, almost exclusively a disease of Chinamen. (B. M. J., Feb., 1890.)

in the past, and New Orleans in the present, alarming numbers come to light.

Just now the point most threatened is New Orleans, for no legal barrier stands to protect the great city which, after a long and dreadful struggle, has lately gained the mastery of tropical yellow fever by quarantine. The successful method of Ulloa and Miro is forgotten or unheeded by the authorities, and must be rediscovered to save the people from the fate of the Hawaiians. Here in California the enemy, few and scattered, is in our midst, and others are liable to come on every ship from China and the Islands; but we have been fully warned, and are armed with lawful weapons. It is our own fault if they do not protect us.

One other provision is needed—a State hospital for lepers. Our statutes enable local authorities to act for themselves, but not one of the counties has a suitable lazaretto. San Francisco has always had more than half the lepers in the State, but its only accommodation is the pest-house, where lepers and smallpox cases are lodged in the same house. That the lepers escape smallpox, and the smallpox patients escape leprosy, is rather good luck than good management. At least one leper has died of smallpox, and some leper of the future may be reminded of a former residence at the same institution for the other complaint. Apart from such improper association of subjects of the two diseases, the pesthouse is an insecure place. Only lately a leper in a far advanced stage has been recommitted, who escaped two and one half years ago, and was at large in the city during the whole interval. A small island near San Francisco would be the proper site for a lazaretto, and accommodations for one hundred lepers would be enough for present and prospective needs, inasmuch as most of the cases have hitherto been sent back to China.

It has also been suggested that a contract be made, if possible, with the Hawaiian Government, to have all lepers cared for at the leper settlement on Molokai.

In Louisiana there is imperative need of such an institution and of legislation equivalent to the Act of California. As to the other States, it would be sufficient to pass the necessary isolation Act, and leave its execution to the State Board of Health, with power to draw warrants upon the treasury, not to exceed a fixed amount, for the expenses. I would not be understood as encouraging any alarm on this subject, even in Louisiana or California. Our State needs only faithful enforcement of existing laws, with a suitable lazaretto, while Louisiana would be saved by a revival of the forgotten plan of Miro, which was successfully in operation just a century ago.

In conclusion, I would not be unmindful of courtesies and assistance rendered in the collection of data for this paper, from a large number of correspondents at home and abroad. They are too numerous for individual mention, further than is already indicated. Among them, officers of Health Boards have rendered especial service. To all I tender sincere thanks.

LEPROSY.

By WOLFRED NELSON, C.M., M.D., Member College Physicians and Surgeons, Province of Quebec; late Member State Board of Health, Panama, etc.

In the spring of 1888 it was my good fortune to pass some time in the island of Trinidad. While there (thanks to the courtesy of the Surgeon-General of the island, S. Leonard Crane, M.D., C.M.G.) I was given the *entrée* of the hospitals, convalescent homes, etc., over which he so ably presides. At the leper asylum I was introduced to Dr. Beaven Lake, in charge of the asylum, and was allowed to see the patients under his care and make a series of photographs. Six of the illustrations hereafter were made at the asylum, and the remaining two—cases of elephantiasis—were made at another institution, partly medical and partly charitable.

Now to consider the illustrations:



CASE 1.

CASE No. 1.

Case of tubercular leprosy; patient, a negro from Venezuela, aged eighteen. He had been in the asylum since 1881. He was going from bad to worse. Three years previous to my visit, Dr. Rake had removed



CASE 2.



CASE 3.

several tubercles from his face. They reappeared within a year. He was a fearful looking object. Some of the tubercular masses were ulcerating or breaking down. Face, ears, wrists, and hands in places were masses of large tubercular growths.

CASE No. 2.

The same subject, showing the left side of the face. Masses of tubercles on some of the fingers were bandaged. His general health was good.

Dr. Rake informed me that the average duration of life in tubercular cases was eight or nine years. The Asylum Reports, page 24 of 1887, give a history of the case.

When the eyes are involved, as they often are, the disease begins in the conjunctive. Later there is corneal infiltration. Iridectomy gives temporary relief. The sight soon goes.

CASE No. 3.

Mixed case of leprosy; patient, a Chinaman. The tubercular growths did not trouble him very much. Dr. Rake was constantly removing dead bone in this case, and opening sinuses in the feet. Man, aged forty. Had been in the asylum three years. He must have acquired the disease in the island of Trinidad, as he left China many, many years ago.



CASE 4.

CASE No. 4.

Patient, a white woman—a creole of Trinidad; aged about forty-five; probably of Portuguese descent. Face shows nothing, and has escaped. The deformity of the hands was great—an anæsthetic case. The average duration of life in anæsthetic cases is ten years.



CASE 5.

CASE No. 5.

Negro, a native of Trinidad; a very old case; fully twenty years old; a purely anæsthetic case; absorption and amputation by nature of several fingers. Some of the fingers in these cases are in-curved. His face



CASE 6.

had escaped entirely. He was looking down while I was making the photograph, which will account for the drooping lids as seen in cut. One would fancy ptosis was present.

Strange as it may seem, many of the lepers, practically without fingers, have acquired a certain dexterity; can use knife and fork, and lift buckets, etc. It seems so strange to see nails growing over the knuckles, but the explanation is simple: the bones have been absorbed and the skin contracts, hence the nails.

Many of the lepers are allowed to do light work—gardening, etc. It keeps them employed and fairly happy. As a whole, they seem a contented lot. They receive the best of care, and have excellent quarters, etc.

CASE No. 6.

Patient, a negro; a very interesting case. Dr. Rake removed a cataract, and got good vision. He published an account of this case in "The Lancet," London, 1886. Patient's vision when I saw him, in 1888, was excellent. His left wrist was full of fluid. By compressing the parts the ends of the denuded bones communicated a grating sensation, as in Charcot's disease. The left carpus can be dislocated any way



CASE 7.

you like. Left hand was bent at a right angle to arm. Patient tottered in walking like an ataxic. A fellow patient had to hold him steady while I was taking the photograph. This case was deemed a very interesting one, and the novelty was to know whether the leprosy had invaded

the cord, or was it locomotor ataxia properly so called. An anæsthetic case.

CASES No. 7.

The men on the reader's right and left are coolies (*i. e.*, East Indians, employed as laborers on the sugar estates). They both have Elephantiasis Arabum. The man in the center is a West Indian negro, having Elephantiasis Græcorum. The former is not associated with leprosy, while the latter is occasionally, but only occasionally. Below are their legs:



The right leg of the patient on the reader's left was a mass of warty growths. The left leg of the negro in the center was a large, misshapen mass. The case on the reader's right shows uniform infiltration, or enlargement of both legs.

As much confusion exists in the ordinary medical mind regarding leprosy and its connection with elephantiasis, I purposely photographed the legs and their proprietors. As has been stated, Elephantiasis Arabum is not associated with leprosy, while the Elephantiasis Græcorum may be, but only occasionally.

Elephantiasis is said to be due to the *filaria sanguinis hominis*; but the latter is found only in some cases. Ligating the femoral for a cure is deemed a very doubtful expedient, as collateral circulation soon sets up, when the old condition obtains.

Dr. Rake is of the opinion that gangrene has been a direct result of the operation. (See Asylum Reports.) In certain cases, free incisions and drainage give relief to a certain extent, but the fluid soon accumulates again. Such cases are hopeless, unless you amputate. Dr. Rake met with a case of leprosy of face in a boy, associated with elephantiasis. The leg was amputated, but at the end of a fortnight pyæmia developed and killed the patient.

Many years ago, when I was a mere lad, my father, the late Dr. Horace Nelson, of Montreal, amputated a leg four inches above the knee, for Elephantiasis Græcorum. The patient was a French Canadian; recovery was perfect. The leg is in the Museum Medical Faculty of McGill College, Montreal.

I have heard of but one case of leprosy in Montreal. It occurred many years ago, and it came under the observation of the late Dr. R. Palmer Howard, who for some days was sorely puzzled by it, but later diagnosed it correctly.

So much for the photographs. I have others by me, but owing to my leaving for England and the Continent earlier than usual, I cannot report them at present.

Now for a few general considerations regarding leprosy, a disease, by the way, that of late has made much unnecessary stir, great sensationalism, as well as causing gross injustices, if not positive cruelty, to several unfortunates discovered in the United States. A few facts, and no theory, regarding this most ancient of diseases: During my five years at Panama, and extensive traveling since, all within the Tropics, I have seen a great deal of the disease. All along the Spanish Main it may be found; also in the West Indies. It is not confined to the lower classes.

Dr. Rake's opinion regarding its cause is that shared by all the students of the disease known to me. He deems the predisposing causes, bad food, bad ventilation, and neglect of personal hygiene; or, in other words, the same causes that predispose to phthisis predispose to it. He says that the parallel between leprosy and phthisis is an extraordinary one. The bacilli of the two diseases respond to the same chemical tests; the enlargement of the glands, the caseation, etc., being identical with phthisis. The latter disease gives the heaviest mortality among lepers, causing a fourth of all the deaths at the asylum at Trinidad.

Years ago, while studying the disease at Panama, it was thought by some writers that sexual connection was the means *par excellence* for propagating the disease. It is not at all unusual to find a married couple, one of whom may be a leper, and the issue may wholly escape the disease.

In the Sandwich Islands, of thirty or forty children born to lepers, but a very small proportion have inherited the disease, two or three per centum only. (See Report Board of Health, Honolulu, 1886.)

Is leprosy in any sense contagious, as we understand contagion? Dr. Rake says that it is not. Such is my opinion. Inoculations made by him at the hospital have failed to produce the disease. (See Island Reports, 1886.) Finally, I do not know a single physician *familiar* with the disease who deems it contagious. All the evidence is quite the other way.

While in Trinidad I asked the Sister of Charity in charge of the Apothecaries' department how long she had been there. Her reply was six and twenty years. I then asked if any Sister of Charity had ever shown any signs of the disease. "Not one," said she. "Pray remember, six and twenty years within a lepers' asylum." A Lady Superior and eight Sisters of Charity, nearly all French women, have charge of the asylum. They are noble women, passing their days among the "living dead." No interviews, no praise from princes, give them publicity; they are satisfied to do their duty without parading it before the world.

Had leprosy been a highly contagious disease how can one explain their immunity?

The Surgeon-General, a gentleman of life-long experience, is no believer in its contagiousness.

It will be safe to state that the danger from lepers is almost wholly imaginary, and exists in the minds of a few medical men in this country who seem to adopt the sensational views of the lay press.

At home, in Canada, Dr. Smith, who has been making careful inquiry among the lepers at and near Tracadie, New Brunswick, states emphatically that it is dying out.

As to treatment: Leprosy practically is incurable; hence, treatment practically is nil. Cleanliness, good diet, fresh air, etc., meet the general indications. Some remedies, such as arsenic, chalmangra oil, etc., and change of scene, are said to be useful. At times slight changes for the better may be noted, but they are temporary. Upon a return to their old habitat the disease resumes its sway. The treatment consists in meeting complications as they arise.

Dr. George Dock, of Galveston, Texas, found two well marked cases in that city—native cases, if I may so term them. He read a paper on them last year at the meeting of the Texas State Medical Association at San Antonio. One of his cases sent to Colorado, improved. The other was stationary—a well marked case, tubercular of many years' standing; man's wife shows no signs of it.

Dr. Guiteras, now of Philadelphia, formerly of Charleston, South Carolina, told me some years ago, when we met in Florida, of seven cases studied by him in Charleston; all Americans, if I remember rightly.

Quite recently, when in New Orleans, Dr. Austin, who has practiced there a lifetime, told me of some fifteen cases. He did not deem it contagious, or that it was increasing. He also is fully of Dr. Rake's opinion that the disease is due to bad hygienic conditions, etc.

One day while in the Post Office in Little Rock, Arkansas, I saw a well-marked tubercular case.

In a letter to me from Dr. Beaven Rake, of date April 23, 1890, he reaffirms his view that leprosy is not contagious, as we understand contagion. He also adds that some authorities deny that it is hereditary.

This isolating of lepers by taking them from their families, is cruel and wicked. Phthisics, we know, are sources of great danger, yet we do nothing. They travel in sleeping cars, expectorate everywhere, yet nothing is said. We do nothing to isolate syphilitics. The sensational articles in the lay press have been adopted by a large section of medical men as gospel. Let us, as intelligent medical men, keep to facts. Let us be just, and not lend ourselves to assisting in oppressing the sick and afflicted. Let us speak knowingly or be silent. Some of the enactments regarding lepers in this country are a blot on legislation, and an admission of ignorance that is wholly incomprehensible to any student of leprosy.

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RECENT PROGRESS OF SANITATION IN CALIFORNIA, AND OUR PRESENT SANITARY NEEDS.

By W. R. CLUNESS, M.D., Sacramento.

(A paper read before the State Medical Society.)

Having reluctantly accepted an appointment to address this society on some subject relating to public hygiene, I would respectfully invite your attention to a brief review of the sanitary legislation which was effected at the last biennial session of our Legislature, in 1889, together with some remarks on other measures deemed of hygienic importance.

The last Biennial Report of the State Board of Health, published in the latter part of 1888, contained some quite severe reflections of the Secretary upon the neglect of the previous Legislature of the State to recognize its sanitary needs, as evidenced by its failure to pass any sanitary bills, except one appropriating \$10,000 for an emergency fund, to be used as far as necessary for excluding infectious diseases from the State. These remarks of the Secretary were resented by some of the Senators who held over and sat in the Legislature of 1889, and for a short time he was one of the best hated officials in the State. None the less, his caustic words had a salutary effect on both branches of our law makers at the last session, and we have to rejoice in an unusual number of Acts of real utility to the State. These are as follows:

Senate Bill No. 11 was an Act to provide for the proper sanitary condition of factories and workshops, and the preservation of the health of the employes. It applies to all establishments where five or more persons are employed, and the Commissioner of the Bureau of Labor Statistics is required to enforce its provisions. The provisions mainly apply to foul effluvia, suitable water-closets separate for the sexes, ventilation, underground apartments in bad sanitary condition, mechanical contrivances for obviating of injurious gases, dust, etc., and seats for females when not required to be on their feet.

The Commissioner, Hon. J. J. Tobin, reports upon the execution of the Act as follows:

When the Act to provide for the proper sanitary condition of factories and workshops was passed, it was intended that this bureau should be supplied with the means to enforce it, consequently the appropriation was increased so that the Commissioner could employ an assistant, whose special duty would be the inspection of factories and workshops, and the enforcement of the law. The Governor vetoed this appropriation, and, as I have to continue the statistical work for which all labor bureaus have been designed, I have been obliged to confine the work of inspection to narrower limits than if otherwise provided. As you are aware, our manufacturing industry in California is very limited indeed. The sanitary condition of our factories and workshops and canneries, except where conducted by Chinese, is, on the whole, very satisfactory. I was obliged to condemn some underground workshops where women were employed as seamstresses, and cellars where bakers were making bread. In some instances, where I had doubts as to the unhealthiness of the premises, I called upon the San Francisco Board of Health, and was guided by their advice. We have not yet reached that stage of density of population and lack of room for extensive factories and workshops when capitalists will be disposed to sacrifice the health of their employes rather than incur expense. A short time ago I issued a special report on the unhealthy condition and surroundings of the cigar factories of Chinatown in San Francisco.

It is greatly to be regretted that the necessary appropriation for carrying out this Act could not be obtained. I fail to see why the Governor could consistently approve the bill to make the inspection, and then defeat its action. It is to be hoped that there will be no failure, when the opportunity again comes round, to supply the deficiency, and that a medical man may be appointed to discharge the duties. The Act, of course, applies to the whole State, and it is probable that the inspections of the Commissioner were confined to San Francisco. A thorough performance of the duties contemplated throughout the State would occupy the time of an Inspector. Were the Board of Health charged with the work, it might perhaps be carried out by its State Sanitary Inspector, provided such an officer be provided by law.

Assembly Bill No. 210 declares that "the Board of Supervisors of each county must appoint, in each incorporated city or town of five hundred or more inhabitants, a Health Officer, who has all the duties and powers of the Board of Health and Health Officer," as is already provided by law, but not previously made mandatory. This Act requires the Board of Supervisors to supply the means of carrying out its provisions. In case they neglect the duties imposed on them, the State Board of Health is empowered, after July, 1889, to direct the District Attorney of the county to take the necessary legal steps to compel the Board to act, or the State Board of Health may make the appointment of the proper Sanitary Officers, and the necessary expenses shall be chargeable against the county. It is apparent that the thorough execution of this Act will result in immense gain to the sanitation of the small towns of the State; but it is too much to expect immediate appreciation of the subject by local authorities, or early accomplishment of its purposes. It is one of those laws which are in advance of public opinion, and calculated to educate the people in hygiene.

Senate Bill No. 89 provides that no human body can be interred or otherwise disposed of without a permit from some Sanitary Officer, Justice of the Peace, or Coroner; and the permit shall be issued only on production of a certificate, signed by a physician, Coroner, or two respectable citizens, setting forth the name, age, color, place of birth, occupation, date, locality, and cause of death. The permit must be filed with the County Recorder.

Such law is indispensable for a complete registration of deaths throughout the State; and as vital statistics are the foundation of public hygiene, this is the first step for a thorough system in California. Besides, it will contribute, to an important degree, in the prevention and detection of homicide. But those who are familiar with mortuary records will not be sanguine enough to expect great precision in death causes. Diagnosis is very far from being an exact science, and nomenclature is a curious function which defies the differential and integral calculus, when it involves the personal equation of the average practitioner. I shall not attempt to estimate the statistical value of certificates made by average citizens. But all things must have a beginning, and a defective one is better than none at all.

Senate Bill No. 92 requires the Trustees of the common schools throughout the State to provide facilities for the vaccination of school children, and to exclude from school all those who have not availed themselves of this provision.

This is the only practicable way of attaining compulsory vaccination

in our free country, and of course it does not reach those children who are not sent to public schools.

The local health authority should supplement the Act by systematic inspection of the schools, to see that the Act be carried out, and should provide for vaccination of pupils after an interval of not more than seven years.

Assembly Bill No. 216 provides penalties for whomever—

1. Willfully fails to keep a registry of the name, age, residence, and time of death of a decedent; or,
2. Willfully fails to register with the County Recorder a certified copy of such register, as is provided for in said chapter; or,
3. Willfully interms, cremates, or otherwise disposes of any human body, in any city, county, or city and county, without first having obtained a permit, as provided for in said chapter; or,
4. Willfully grants a permit for the interment, cremation, or disposition of a dead human body, without the certificate provided for in said chapter; or,
5. Willfully violates any of the laws of the State relating to the preservation of the public health.

This Act was needed to give vitality to legislation on those various subjects where no penalty was provided previously.

Assembly Bill No. 69 was an amendment to an existing law regarding street work in municipalities, giving the authorities due powers, and property owners suitable privileges to protect their interests. The Act is designed for the improvement of roadways and sewers, and, therefore, conducive to public health; but it is too long for analysis here.

Assembly Bill No. 75 declares it to be a misdemeanor to bring into the State any domestic animal knowingly affected with any contagious or infectious disease. As domestic animals have a clearly defined value, it may be expected that the pecuniary interests of stock owners will cause this law to be strictly executed. But the time certainly has not come when human lives can enjoy such protection against foreign infection.

Possibly the wisdom or ingenuity of the twentieth century may compass the problem of human infection, by making it a misdemeanor to communicate certain diseases, such as syphilis and smallpox.

Most of the above Acts originated with the State Board of Health. It has accomplished a great work in their enactment; but it will be a greater and more difficult achievement to have them fairly executed. Many of them are far in advance of the desires of average citizens, and never would have become laws without the active exertions of medical men in and out of the Legislature. The support and influence of medical men throughout the State, and particularly of the members of this society, are needed to preserve their vitality, to foster their growth in the public appreciation, and to bring them to a sound fruition of public benefits.

The Secretary of the State Board of Health reports upon the execution of the above Acts, as follows:

So far the working of the Act requiring burial certificates is not by any means perfect, but it is in a measure complied with wherever we have a Health Officer that does his duty.

After a few prosecutions are instituted, I think we will have more satisfactory results. The Vaccination Act has not yet been put in successful operation, pending a trial of its constitutionality, which is now in the Courts.

In regard to Sections 3062 and 3064, relating to Boards of Health (Assembly Bill No. 210), the law has been complied with in nearly every county; but as a defect existed in the draft of the law, we are unable to enforce the provisions of the law until this defect is rectified. No prosecutions for violation of any of the laws relating to sanitary matters have been instituted, for the reason that none of them are perfect enough to abide such

issue successfully. Altogether, considering their imperfection, I must say that we have made considerable sanitary progress in establishing Health Boards and Health Officers; and, if more power were intrusted to the State Board, I think that, without doubt, the law could be made efficient.

All the sanitary measures which were enacted were substantial gains to the public health. The others are more or less dependent upon the one which requires the creation of local Health Boards and Health Officers, and it will probably not be difficult to cure their defects, so that there will be no bar to their due enforcement. In my judgment, the most efficient agent for bringing about a speedy and cheerful observance of sanitary laws, would be the personal influence of a representative of the State Board of Health, acting under its instructions, and carrying its influence to all parts of the State. In any case, some time will be needed for the accomplishment of the objects aimed at.

The people must be convinced of their utility, and must witness at least partial trial of their working before they give full compliance.

The following bills designed to promote the sanitary interests of the State failed to become laws:

Assembly Bill No. 213 called for an appropriation of \$20,000 for the prevention of the introduction of contagious diseases. This was not passed, inasmuch as it was found that the unexpended balance of \$6,000, of a previous appropriation for the same purpose, is still available.

Senate Bill No. 625 provided for the appointment of a State Veterinarian and assistants, for the purpose of excluding and suppressing contagious diseases among domestic animals.

There were other bills looking to the same end, and there seemed to be a great interest in this subject among members of both branches of the Legislature. It is rather probable that if some bill could have been framed so as to harmonize the conflicting interests of different veterinarians and varying views of stock owners, it might have passed and received the Governor's approval. The existence of anthrax in various parts of the State for many years, annually recurring on the same fields, and the occasional introduction of the Texas distemper from Arizona and the Mexican State of Sonora, demonstrate ample cause for legal interference.

The State Board of Health has not decidedly craved the task of controlling animal plagues, though they clearly concern in a degree the public health; but it is not likely they would shrink from it were the duty imposed by law, together with the necessary powers and means of execution.

Assembly Bill No. 648 provided for the appointment of additional Health and Market Inspectors in cities of more than fifty thousand inhabitants. It was framed and urged to passage in both branches of the Legislature, in the interest of the San Francisco Board of Health. The Governor, however, saw fit to deny his approval, and there was no opportunity to pass it over his veto. There is no question that these additional officers are greatly needed, for the city has more than doubled in population in the last twenty years, while the plan of organization of its Board of Health has undergone no material change.

Assembly Bill No. 211 created the office of State Sanitary Inspector, and passed both branches of the Legislature with little opposition, during the closing days of the session. Unfortunately at this time the Governor had become unfriendly to the State Board of Health, and he refused

to sign the bill. Such an officer is urgently needed to enable this body to discharge the duties imposed by the Act creating it, as the following quotation shows: "The State Board of Health must place themselves in communication with the local Boards of Health, hospitals, asylums, and public institutions throughout the State, and take cognizance of the interests of health and life among the citizens generally. They must make sanitary investigations and inquiries respecting the causes of disease, especially of epidemics, the source of mortality, and the effects of localities, employments, conditions, and circumstances on the public health, and gather such information in respect to these matters as they may deem proper for diffusion among the people. They may devise some scheme whereby medical and vital statistics of sanitary value can be obtained, and act as an Advisory Board to the State in all hygienic and medical matters, especially such as relate to the location, construction, sewerage, and administration of prisons, hospitals, asylums, and other public institutions."

How completely the advisory function of the State Board of Health in the location of public institutions has been ignored, is illustrated in the fact that members of the Board are never appointed by the Governor to serve on such a commission, nor is the Board in a general or individual capacity consulted in such matters. It is probably not attributable to want of confidence or to intentional discourtesy, but to inadvertence—possibly ignorance of the law. In view of some recent sanitary mistakes of the kind, it might be supposed that the State Board of Health would be put to some such responsibility as the law contemplates, for prudential reasons.

It is apparent that the duty of the Board toward public institutions involves repeated visitations for inspection, and they have recognized and partially carried it out themselves; but they are not paid for this work, and it costs valuable time, which the members cannot spare. The work of the Secretary (the only salaried officer) requires his almost constant presence at the Capital. Sanitary investigations into the effects of localities, employments, etc., on the public health, mean nothing less than a sanitary survey of the State, if carried out on a scope worthy of the health interests of our great commonwealth. Besides, effectual communication with local Boards of Health implies something more than the reception of sanitary reports. They need the instruction, encouragement, and personal influence of the State Board, and this involves frequent visitations and contact with its representatives. Moreover, as an Advisory Board for the location, construction, sewerage, and administration of public institutions, it was evidently contemplated by the law makers that the Board of Health should be consulted in the location of these institutions, and in the course of the construction of the buildings; but hitherto their services have not been in request, nor indeed has the Board been prepared to perform the duty, for want of a suitable officer who could be sent wherever needed.

Again, emergencies have arisen, and are liable to recur, when one or more special inspectors have been needed to ward off danger of foreign pestilence, and it has been necessary to employ such auxiliaries as could be found willing to leave their ordinary business. Surely a Health Department should be as well prepared for occasional dangers as a Fire Department.

For these reasons I confidently expect that the State Board of Health

will be allowed such an officer before the close of the next biennial session of our Legislature.

As to the sanitary needs of California, I have already alluded to a sanitary survey of the State. The importance of the work is beyond question. At the same time there is precedent for it in Illinois, where it was commenced in 1883, under the auspices of the State Board of Health. The details are carried out by local health physicians, who are sanitary officials, wherever there is a local health organization. Up to the end of 1886, nearly five hundred thousand inspections and re-inspections of premises, in about four hundred cities, towns, and villages, have been made. Thirty-four of the more important cities and towns have completed their sanitary surveys, affording data upon location, population, and climate; topography, water supply, drainage, and sewerage; streets, alleys, and public grounds; habitations, gases, and lighting; disposal of garbage and excreta; markets and food supply; slaughter houses and abattoirs; manufactories and trades; hospitals and public charities; police and prisons; fire establishments; cemeteries and burials; public health laws and regulations; municipal officials; registration and statistics of deaths and diseases; municipal sanitary expenses, and public schools. Of sanitary defects discovered by the inspection, it is estimated that 93 per cent have been corrected, and it is safe to say that the majority of these would otherwise have continued.

Although the death rate of California is lower than that of most of the States, the credit is due rather to climate than to superior sanitary provisions. The latter may be improved, but the defects must be discovered before the proper steps for amelioration can be taken.

Past experience in this State, as in others, proves that a general undertaking like this will never be carried out as a uniform plan, nor with efficiency, without direction and supervision by some recognized official.

The subject of the pollution of streams has already attracted the attention of the State Board of Health, and will be one of growing importance as the population of our cities and towns increases, for those streams must more and more be the dependence of people for household uses. The greatest harm resulting from sewerage into streams, is the pollution of water drawn from such streams for domestic purposes; but there are other evils, such as the destruction of fish, and the gradual destruction of their channels. The principal rivers of the State flow along and through so many different counties, that it will be found impracticable to find a solution of the problem in action by the local authorities, either separate or concerted; and, in the near future, our State Legislature must devise a general plan to stop the mischief. In the meantime, sanitarians must find some practicable means to dispose of the sewage and refuse of the cities and towns which have hitherto used the adjoining streams as common sewers.

In the densely populated countries of Europe, and in some of the Eastern States of the Union, the problem has been satisfactorily solved, and we have only to select the most approved plans, or those best adapted to our local conditions.

The impurities which now go to our streams are mainly the contents of the sewers and, partially, the solid garbage hauled from premises. Sewage in coastwise cities and towns flows into the sea without regard to ebb or flow of the tide, and much of it is cast back on the shore by flood tide. If the outflow is to be into the sea, it is desirable to discharge

it only during the ebb; and even this plan will not suffice for the cities fronting the bay of San Francisco.

At present the evil is not much felt, but it will be grievous when the whole shore line becomes settled to the outer heads. The interior cities must make provision for their sewage much earlier. On the continent of Europe, Dantzic was the first city, or among the first, to apply its sewage to neighboring lands by irrigation as a fertilizer, and Berlin followed the example. The Gennevilliers farm receives about one sixth of the sewage of Paris. Edinburgh makes a partial disposition of its sewage successfully in the same way. Birmingham, with a population of six hundred and twenty thousand, effectually disposes of its sewage, amounting to sixteen million gallons daily, on a tract of one thousand two hundred and twenty-seven acres. This land is under-drained at the average depth of four and one third feet, and is thus capable of receiving such an enormous outfall of sewage without offense to the senses or detriment to crops used for human consumption. Other sewage farms in Europe are thus exhibited:

TOWNS.	Population Furnishing Sewage.	Daily Dry Weather Sew- age—Gallons.	Acreage of Land Irrigated.	Population to each Sew- age Acre.	Nature of Soil.
Aldershot.....	8,000	---	99	77	Sandy.
Bedford.....	22,000	1,000,000	155	142	Porous.
Breslau.....	300,000	7,707,500	741	400	Porous.
Croydon.....	65,000	4,700,000	450	144	Porous.
Dantzic.....	100,000	3,063,700	385	250	Porous.
Doncaster.....	24,000	600,000	200	120	Porous.
Leamington.....	26,000	800,000	375	69	Porous.
Oxford.....	41,000	1,250,000	318	128	Porous.
Warwick.....	12,000	1,000,000	130	82	Clayey.
Wimbledon.....	20,000	560,000	61	328	Porous.
Wrexham.....	10,000	400,000	80	125	Porous.

Prof. H. Robinson prepared a table of nineteen towns in Great Britain, giving the following averages: One hundred and thirty-seven people to each acre irrigated; fifty-one thousand one hundred and twenty-eight imperial gallons of sewage applied daily per acre; thirty-eight imperial gallons of sewage per capita of population daily.

Mr. H. U. McKie, City Engineer of Carlisle, England, gives these averages for various British towns: Ninety-eight people to each acre irrigated, for fifty-three towns; three thousand eight hundred and twenty-six imperial gallons of sewage daily per acre, for thirty-three towns.

For agricultural purposes one acre of land is considered sufficient to dispose of the sewage of one hundred persons. If the land be used for purification only, much less acreage will suffice.

In England the most suitable crop for sewage farms is thought to be Italian rye grass, which is fed to milch cows. This will take an enormous amount of such irrigation, with astonishing results. The first three thousand tons of sewage applied annually per acre, at intervals, gives an increase of about fifteen tons of green grass; but above this the increase is in diminishing ratio. The yield has been as high as forty tons of grass per acre per annum.

Professor Voelcker found that beets raised under irrigation gave 13.19 per cent of sugar, while the best yield in Holland, England, and Scotland, under other cultivation, is 9 to 10 per cent of sugar.

The charge of insalubrity against sewage farming is not sustained. Analysis of well water on these lands shows no organic pollution, and demonstrates the thorough filtration of waters, with combined oxidation by the growing vegetation of the matters in solution and suspension. Observation has not shown typhoid fever or diarrhoeal complaints more prevalent on such lands; but it might be expected that neglect of under-drainage might be followed by malaria. Bad management of sewage tanks and accumulation of sludge without deodorization may render the system offensive, but such an evil is unnecessary.

The economic question of sewage irrigation appears to be unsettled as yet. Dr. F. W. Ford, in "Bucks' Hygiene and Public Health," remarks: "Sewage irrigation in some cases has been remunerative, but it is very doubtful whether it will ever become a valuable source of revenue to any town, however favorably situated. The question of expense is a very important one, and the system should be made profitable, or at least self-sustaining if possible; but if this cannot be brought about, the pecuniary sacrifice should be endured, in view of the great sanitary advantages of the plan."

Samuel M. Grey, C.E., of Providence, observes: "The financial results of sewage farming depend greatly upon local circumstances and management. It is said that the income from sewage farms will sometimes pay the cost of operating them. If, however, the annual expenses of interest, sinking fund, and the pumping of sewage be charged against the farm, this should not be expected."

The tract of land at Beddington (near Croydon), where sewage has been applied for twenty-six years, has risen in assessed valuation from £1 to £9 per acre. The plain of Gennevilliers, near Paris, has been converted from barren sands to fertile gardens by sewage irrigation. It is said that the Duke of Portland employs no fertilizer but sewage on his farm at Mansfield, and obtains a net return of about of \$125 an acre.

The sewage farm at Leamington is well managed and profitable with the disadvantage of a lift of one hundred and thirty-two feet. The Chairman of the Committee on Sewage for the city of Berlin, reports that the sewage farms are beginning to yield better revenue, showing a profit of 2 per cent on the outlay, and he hopes for improved results. The sewage farm adjoining Pullman, Illinois, produces cabbages, celery, and onions, and has yielded a fair profit on the investment.

We should observe that sewage is almost the only fertilizer which the Chinese have to use, from the scarcity of domestic animals, and it must contribute largely to the productiveness of a soil capable of supporting so dense a population. Dr. Tidy, of London, estimates the value of town sewage at 8 or 9 shillings per capita per annum.

Messrs. Lawes and Gilbert put it at 6s 8d, or \$1 60. Thus it appears that San Francisco annually empties into the sea matters worth at least \$500,000, if applied in the right way. Surely a part of this sum ought to be saved.

Obviously, all depends on good management. A municipality would find the plan an expensive one, but a well administered stock company or large land proprietor could operate more successfully. Any city would gladly give up its sewage with all reasonable facilities for its conveyance away.

A very valuable contribution to the discussion on sewage disposition was a paper read before the London Society of Arts on "London Sewer-

age and Sewage," by Sir Robert Rawlinson, who stated that the entire volume of London sewage is now valued at \$8,750,000 per annum.

According to this authority, land is not corrupted by sewage irrigation, but is improved, as the solids out of one hundred tons spread over one acre of land would not give a surface deposit of one one hundredth of an inch in thickness. In the discussion which followed the paper, Dr. Charles Drysdale said that all the European nations were looking to England for a solution of the question, and many of them had sent engineers over there to study what had been done. Paris had now a very successful sewage farm of one thousand five hundred acres, which produced most magnificent crops, and the effluent was so pure that any one could drink it, as he had done himself. In Berlin also, where the authorities had sent engineers to study sewage farming, they had about one thousand acres on the north and south, and not a particle of sewage was sent into the river. So far as the disposal of sewage went, every possible plan had been tried, and it is well known now, said Dr. Drysdale, that the only possible way of purifying sewage is by passing it through fitting soils.

In California, farmers have to pay for clear water, which often has to flow farther than town sewage needs to to reach suitable lands, while the latter has greater value. Apart from disposal of sewage, irrigation is less understood and less practiced in England and Germany than in California.

This fact should give us an advantage in sewage irrigation on the financial side. It is certainly time that the practice of throwing the solid garbage of cities and towns into running streams should cease. The more usual plan of dumping it upon vacant lots is less objectionable, but still is a nuisance, whether burned or left to putrefy. In various cities of England, of the Dominion of Canada, and of the United States, it has been found practicable and comparatively inexpensive to get rid of such matter by cremation in furnaces. In a paper read before the American Public Health Association in 1886, Dr. George Baird, of Wheeling, West Virginia, showed the practicability of quickly consuming night soil and carcasses of animals by a furnace costing not more than \$2,500.

Within the last five years cremation furnaces for garbage have been erected and are in successful operation at Alleghany City, Pittsburg, Chicago, Des Moines, Milwaukee, Minneapolis, Coney Island, and Montreal. At Montreal, with a population of about one hundred and fifty thousand, a contract has been made with Mr. Mann, inventor of a furnace bearing his name, to collect and cremate the garbage of the city for five years, for an annual payment of \$43,000. Families deposit their garbage twice a week in barrels on the sidewalk, where it is removed by the contractor. The cost for each household would be less than \$1 50 per annum; but in San Francisco the cost is at least twice as much to have the stuff removed to dumps where it remains a nuisance. The cost of operating the Mann furnace is estimated at 25 cents for each ton of ordinary refuse consumed, and three times as much for night soil. The Engle Destructor, used at Des Moines and Minneapolis, has been found to dispose of refuse, consisting largely of carcasses, for less than 20 cents a ton.

But these furnaces have been greatly surpassed in economy. In 1883, Mr. George Shaw erected a crematory at London, where the garbage is

dried on platforms arched over in the fashion of a reverberatory furnace. The platforms slope towards furnaces, where the dried refuse is pushed down and cremated. When once well under way, the furnaces need no other fuel, and heat enough is gained to operate a steam engine for lifting the wagons to be dumped, and to work up the residue from the furnaces into mortar with lime. By sorting over the refuse beforehand, a variety of substances may be saved, such as fragments of iron, glass, coke, cinders, bones, rags, and cork stoppers. The resulting clinker represents about one sixth of the weight of the refuse, and may be ground with lime for mortar.

The plan of Mr. Thomas D. McElchenie is perhaps still better. In the "Sanitarian," Vol. 17, 1886, he proposes to deal with household refuse by a process of fractional distillation, in retorts.

When moderately heated, melted fat may be drawn from them through cocks at the base. As the heat is raised, ammonia is given off, which is utilized. At a higher temperature, illuminating gas is produced. The remaining coke in the retorts is a good fuel, and the ashes yield some potash.

Another sanitary need of our California cities is a systematic flushing of the sewers. As the sewers have to dispose of storm waters, in addition to sewage proper, they are sufficiently washed out during the winter season, but during the long dry summer the flow is too scanty for keeping them clean of putrefactive matters, and at times the stench of sewer gas becomes overpowering. During the two or three months previous to the beginning of the rain, the effect on the public health becomes perceptible in the increase of diphtheria, typhoid fever, and diarrhœal complaints. A suitable method of flushing would be through towers or stand-pipes from seventy-five to one hundred and fifty feet in height, by means of which the sewers could be flooded successively. These same towers might also be made a very important auxiliary to the apparatus for extinguishing fires. In all coastwise cities salt water would be available, so as to not draw upon the usual supply for household uses. I am not prepared to give an estimate of the cost, but am sure that it would be moderate, in proportion to the benefits of the double service yielded. The plan of flushing with salt water is, of course, not adapted to the use of sewage for irrigation. In the latter case it would be the duty and interest of the farm owners or sewage contractors to provide for the systematic flushing of the sewers during the dry season with fresh water. The health authorities should require it, and the water should be needed as a carrier of the fertilizer to their lands.

In all our cities, and especially in the largest, the slaughter houses come very far short of what our necessities and the first principles of civilization demand. The slaughtering of animals upon a large scale can never be carried on without the cremation of offensive nuisances, unless it is under strict sanitary supervision; and, to make this work practicable, the business must be concentrated in a very few spots, sufficiently remote from centers of population, and with facilities for water carriage of sewage. The most important large cities of the world have public abattoirs, fitted with necessary appliances for utilizing all parts of the animals, of rapid removal of refuse and sewage, and of constant cleansing, so that nothing is left to putrefy in the buildings or on the grounds. The advantages of concentration and system in the business are manifold: (1) In the utilization of much matter that goes to waste

in small establishments; (2) in diminished cost of slaughtering; (3) in avoidance of all nuisances injurious to health and offensive to smell; (4) in avoidance of those dangers and scenes shocking to humanity, which are inseparable from the business when pursued near dwellings; (5) in opportunities afforded for thorough and regular inspection of the animals before slaughtering, and of all parts used for consumption before they are offered for sale. All these advantages are positive and important, and it is to be observed that thorough inspection is out of the question under any other plan.

But right here it is proper to state that the public abattoirs have always met the strenuous opposition of stock dealers and butchers, and this is sure to be our experience in California. On the other hand, it is found that all become satisfied with the plan when accustomed to it, but it may be presumed that the pecuniary gain reconciles them to the sanitary supervision, which they would always like to dispense with.

This, however, is the feature which most concerns consumers, and should decide the matter. The experience of San Francisco within the last two years, satisfied me that the sanitary reform ought not longer to be postponed. It is the true solution of the whole difficulty, and can be effected by the determined and persistent action of the local authorities. The step means war, but it cannot long be deferred, and the difficulty will only increase by postponement. The example, once set by San Francisco, can be followed by the other cities with diminished opposition.

Allusion has already been made to the failure of a bill to increase the sanitary force of San Francisco. The subject deserves further remark, both as to its cause and consequences. With reference to the latter, I observe that the sanitary service of our metropolis has never been what it should be, and never can be, without a largely increased force.

Under the present system nuisances continue until citizens bring complaints to the Health Officer. The right way is to discover most of them by systematic and general house-to-house inspection.

All premises in the city should be visited at least once a year; many need visiting as often as once a month, and some once a week, or oftener. This plan necessitates a great increase in the number of inspecting officers, with corresponding reduction of the territory of each, and one or more additional medical officers to supervise the work. Practical sanitation is essentially missionary work. People must be visited at their homes and places of business.

Neighbors who are friendly dislike to complain of each other, and tenants dislike to report their landlords. Official inspection under authority obviates all difficulty between individuals, and forestalls most of the causes of complaint.

The defeat of the bill, which would have given partial relief to the defective sanitation of our large cities, was due to a political complication, which need not be explained here. Politics is sure to be the bane of sanitation wherever the two come in contact. Members of this society belong to both political parties, and to various religious organizations, and no discord results here, because political and religious issues are never raised, and would be instantly ruled out. Until recently the same neutrality has prevailed in the State Board of Health, and always in the State asylums for the insane.

Within the last two years there has been an intrusion of politics into

the State Board of Health, the result of which has been litigation for one of the seats and the defeat of important legislation, for want of which sanitary interests are suffering. The Governor of the State has been made the instrument of working all the mischief, but it is manifest that he has been influenced by members of the profession, as well as by others, who have less regard for public good than for personal gain. I am dispassionate on this subject, but speak plainly from a conviction that it deserves the attention of the highest medical body of the State, and in the hope that its members generally will agree with me that politics should have no more to do with the public functions of medical men than with their private practice.

Finally, I would observe that the fairest and most satisfactory plan is to give both parties as nearly as practicable equal representation in the membership of the Board, and then the same rule will be followed in the sanitary personnel. This has been the case with the State Board of Health, but unfortunately the San Francisco Board has been habitually appointed by the Governor as far as possible from his own party. Stability in organization and consistency in policy can never exist in this way. Public school teachers and policemen hold office during good behavior, and no reasonable person doubts that this plan is largely conducive to the exceptionally high qualifications of those public servants of our metropolis. What concerns the public health is not secondary in importance to the public peace or public education, and sanitary administration should be as carefully guarded against debasing influences. The public look to the medical profession for the conservation of their health interests, and it is especially our fault if they go wrong or fall short of due measure.

I desire to state here that one of my colleagues on this committee, as well as in the State Board of Health, suggests the utility of Sanitary Conventions, to be held under the auspices of the State Board of Health. The object is to arouse, in various parts of the State, an interest in public hygiene among all classes of people.

Such Conventions have been held in Michigan, Ohio, Pennsylvania, Kansas, and other States, and the proceedings embodied in the reports of their State Board of Health indicate good work in the character of the papers read, and the discussion upon the papers, and in the attendance upon the meetings. In my judgment, this proposition is worth trial, and I hope and believe that useful results would follow.

YELLOW FEVER.

By DR. DOMINGOS FREIRE, Professor in the Faculty of Medicine, Rio de Janeiro, Brazil.
Specially written for the Eleventh Biennial Report of the California State Board of Health. Translated from the original by Mr. Richard U. Clark, New York City.

I do not know of any subject so capable of attracting the attention of the medical world of both Americas as is the study of the malady which is the theme of this article.

It is the bane of the American continent, as cholera is of the continent of Asia. Besides its innumerable ways of approach, and the enormous mourning it each year leaves behind it in thousands of families, it constitutes an element of danger for those European countries in constant communication with us and the coasts of Africa, and frequently breaks up the commercial relations which exchange, between the nations, the seeds of progress and of civilization.

To point out the methods of eradicating this morbid hydra, whether by therapeutic means or by a reasonable and well founded prophylaxis, such is the end to which, with certainty and determination, sanitary authorities throughout the New World should direct their energies.

As the trans-Atlantic lines of steamers multiply, and as in each country the railroad communications become complicated networks, binding the shores to the mountain plateau, and to the interior provinces, this is a corollary of hygiene in which the epidemics of yellow fever become domiciled throughout their extensions, while alongside of the benefits of progress they receive as a baneful hostage the attacks of this terrible microbe, which at once begins its deadly work without paying any import duties upon the defenseless people.

An attentive analysis of the circumstances, the invading march of the yellow fever after its original debut, fully authorizes us to admit that induction.

In fact, coming from the Gulf of Mexico and from the Antilles, the cruel pilgrim overruns several countries of the American continent, visits Europe and Africa, ravaging Jamaica, Spain, France, the Ascension Islands, Fernando Po, and Boa Vista. Everybody knows that the epidemics of Cadiz, of 1730 and 1764, resulted from the arrival at that port of vessels from America. From Cadiz the disease was transferred to Seville by vessels. Let us recite a fact to prove this, and it would be easy to mention many others.

On arrival at the island of Boa Vista (Africa), the English ship "Eclair" showed some signs of the dread malady, which, in the twenty-three days she remained in port, carried off three hundred persons.

In Portugal, the epidemics of Oporto, 1851, and of Lisbon, 1723 and 1857, became celebrated. The latter caused six thousand eight hundred deaths in the nineteen thousand attacked by the disease, or 35.7 per cent.

France has had seven epidemics: at Brest, 1802, 1815, 1839, 1856; Marseilles, 1821; St. Nazaire and Bordeaux, 1861.

England itself, in spite of its climate, has not been able to escape from the ravages of this scourge, which seized and made victims in Southampton, 1745 and 1852, and in Norfolk, 1855.

In 1825 an epidemic broke out in Scotland. All these epidemics were imported from our continent.

America will present a grand example of civilization in arresting, through vaccination at the start, this dreadful pest. I am more than convinced that the application of prophylaxis (to which further on I shall refer) will yet suffice to obtain that result.

Notwithstanding the opposition of prejudiced and opinionated parties to the new ideas, which has already become an axiom as respects all discoveries, we have a presentiment that the facts accumulated by us by thousands, to prove the efficacy of our preventive method, will yet loudly proclaim that the grand epidemics of Mexico, Boston, New York, Philadelphia, Baltimore, Quebec, New Orleans, Jacksonville, Buenos Ayres, Montevideo, Rio Janeiro, Campinas, etc., will shortly be consigned to the domain of the dead hands of history, as was the case with the frightful devastations caused by the smallpox in Asia and in Europe before the blessed discovery of Jenner.

Referring specially to Brazil, the invasion of the first epidemic dated in 1686, was brought to Pernambuco by a vessel from St. Thomas, where the epidemic raged intensely.

The epidemic of Bahia in 1849, which passed to Rio in 1850, was imported in a vessel called the "Brazil" from New Orleans, where the disease had then many victims.

The invading march of this malady proved, by all these examples, the existence of a germ producer, transmissible by maritime routes. That it in the same manner transmits itself by land, we can prove by citing the facts which were seen in Brazil and elsewhere. We have, even last year, seen the epidemic developed at Santos, imported by railroad to the city of Campinas, Santos having been in its turn infected very probably from Rio Janeiro.

The epidemics of Cataguaries, Vassouras, Rezende, etc., cities situated on the Central Railroad, are so many examples of contagion by land routes.

The first case once appearing at any point represents the point of departure for the other cases which manifest themselves, communicating from neighborhood to neighborhood, so as to embrace entire zones of greater or less extent.

If we reflect upon the march of all epidemics of yellow fever in the different countries, we are drawn to the following conclusion: *that the yellow fever propagates itself by means of a contagious agent susceptible of reproduction always equal in point of morbid element.*

It is unnecessary to admit that this agent is a living entity, inoculating itself either directly or by the intermediary of the *circumfusa* in one organism, or it lives a parasite, fulfilling the cycle of its evolutive destiny.

Observers have been searching for this specific agent since 1494, the date of Christopher Columbus' return to Europe, who stated that "among his sailors a great many had been carried off by a disease which dyed the skin yellow like gold."

To-day, apart from the obstinacy of the skeptic, we know positively what is the productive agent of that affection, not only by means of experiments on animals, but (and it is an argument of great value) by

means of inoculation in an attenuated state of this same agent, the *inoculation* producing the same symptoms as mild yellow fever, according to the testimony of a great number of illustrious confreres, as we shall see later.

What, then, is this contagious agent?

Within the limits of a short article, I am unable to give the reader a minute description, all of which can be found elsewhere in the books which I have published on this subject.*

I will confine myself to saying that the yellow fever microbe is a *Micrococcus*, or *Cryptococcus xanthogenicus*, whose dimensions are one micromillimeter, staining well by aniline colors (violet, methyle, fuch-sine, and red cherry, color them easily). They present themselves both isolated and also in chains and in irregular agglomerations.

On examining these agglomerations in a fresh state, they imitate the configuration of certain fruits, such as raspberries, pineapples, etc., in outline.

It is necessary to observe (and I expressly insist thereon) that these agglomerations are the result of the gathering of a large number of micrococci by the aid of some glutinous intermediary matter. According to observations made by Finlay in Havana, and by myself, many micrococci envelop themselves in capsules, from which the membrane will detach itself at a given moment, as occurs with the *Tetragenus micrococci* described by Mr. Koch, and cited by Mr. Corneil (page 231, Treatise on Bacteria, second edition, 1886). Although it may be rarely that the micrococci reproduce themselves by spores, I am of the opinion that the *Micrococcus xanthogenicus* casts off spores with extraordinary fecundity. Only a little while ago, it was deemed heresy to say that micrococci could propagate by means of spores. Later it was seen that it was possible when, for example, they lived in a mass containing an insufficient quantity of nutritive matter. Finally, Mr. Prooe, in keeping with our views, has described the formation of spores in the *Micrococcus achrolencus*, a species which he has isolated from urine. It is because these observers do not remember that they are cultivating bacteriology, a new science, whereby they will little by little make laws in accordance with facts, and such laws have no birthright privileges. They may have their cradle in America as well as in old Europe. It is a curious fact that whenever a new discovery is announced in our country, it is met with a positive denial—it might be said that the good God did not make brains and eyes except for the fortunate mortals of the Old World—while they often accept without any proof the most absurd conceptions, which are not slow to recoil on the heads of those who have defended them. We must do away with these authoritative centers of scientific irradiation. *Sol lucet omnibus*. Now let us study the manner of living of the *Micrococci amaril*. It is an aerobe, dying in glass jars where it has not a sufficient provision of oxygen. It lives well at the expense of albuminoid matters. I prefer, for cultivating them, the alkalized gelatine, however; it will develop equally well in beef broth, in the serum of the blood, in peptonized fungi, agar, etc. The gelatine is by it liquefied little by little. If we inoculate the agar jelly with a drop containing these micrococci by means of platinum wire, they form

* "Microbe Doctrine of Yellow Fever and Preventive Inoculations"; Rio, 1883. "Experimental Studies on the Contagion of Yellow Fever"; Rio, 1883. See also the reports of the Ninth International Medical Congress; Washington, 1888.

colonies all along the pierced surface, in appearance like a tack, sharp at the point, growing circular at the top. The color of these colonies is at the outset white, like lead; later it forms in places yellow spots or brown points.

The colorings are very appreciable in the gelatine after it has been liquified by the micrococci; it is seen at length to take a shade more and more of yellow, at the same time it makes at the bottom of the balloon of culture a deposit of a dark color, which at length becomes black.

I have observed this singular fact, that the balloons of a large capacity are the most appropriate for the production of the pigments yellow and black.

The proof of it is that in the little Pasteur matrass and in the test tubes, in which ordinarily cultures are made, they produce very few pigments. I explain this difference by reason of the greater quantity of air contained in the larger vases. I will add that the black pigment is insoluble, the contrary of the yellow pigment. The excessive zeal of certain bacteriologists received with bad grace the news which I gave them in 1880, that the yellow fever microbes elaborate pigments in the same way as the *Mycoderma vini* makes alcohol, and that the *Bacilli amylobacter* made butyric acid.

I have never found this idea to be "bizarre," as I already knew, by reason of my reading of botanic micrography, that there exists some micro-organisms which enjoy the functions of being workers in miniature, elaborating beautiful coloring matter. Who has never heard speak of the *Micrococcus prodigiosus*, which forms spots of blood on the host* of the *Bacillus cyanogenus*, causing the color of blue milk, and of all the other little beings so patiently described by Mr. Cohn and other naturalists?

But the idea established by the bacteriologists on the announcement of my views, based upon the observation of cultures, and the coincidence of the presence of a yellow matter and another black matter in the skin, and in the matter vomited by yellow fever patients, was that there could not there exist a chromogenic microbe which at the same time should be pathogenic, and why? For the simple reason that they, the legislators of bacteriology, had never seen such a thing. From that came a flood of censure more or less spirituelle against the modest observer who had dared to declare a phenomenon which they had not yet admitted. But there was no great delay in the publications of the *Staphylococcus pyogenes aureus* found in the pus of boils, and which kills the animals into which it is injected. There is also, face to face before these scientists, the *Staphylococcus pyogenes citreus* found in certain abscesses—the *Oscillaria* of Laveran, accompanied by pigment, which are found again in the blood, etc. All these examples of chromogenic and pathogenic microbes at once confirmed my observations, although my name may rest in oblivion as the indicator of these facts.

That is the way we are discussed and criticised.

I continue, therefore, to maintain that the black matter vomited is not altered blood, but the pigment produced by the microbe we are studying, and that the jaundice of the patient is due, not to the bile, but to the yellow pigment produced by the micrococci. If you doubt that, you must also doubt it of the alcohol we drink, and which is but the

*The plant that the parasite feeds on is called the host.—Translator.

product of an alcoholic fermentation. Will it continue to be doubted, notwithstanding the production in the culture balloons of these coloring substances which may be chemically isolated, just as carmine, indigo, or other coloring matter is isolated?

Will it continue to be doubted, notwithstanding that the spectroscope refused to show any band of absorption, notwithstanding that the most delicate chemical agents are not able to reveal the least trace of iron, which is the necessary element of the blood. The experiments made in our laboratory in the presence of Dr. Cominhoa A. Cæsar Fernandes Alvarez, a physician commissioned by the Spanish Government, and some others, have been negative on this subject. Mr. Cominhoa, in his inaugural thesis, Rio, 1887, described his experiments, demonstrating positively that the blood cannot be altered in a way to produce the black coloration so characteristic of the vomited matter, under the influence, simply, of gastric juice; on the other hand, one of the most distinguished professors of the Faculty of Paris, several times cites the presence of these pigments accompanying the microbe of yellow fever. It is necessary to call attention to the fact that this professor states that I have given drawings of these pigments in my plates of the "*Micrococcus xanthogenicus*"—in fact, Mr. Comel, who is the savant to whom I refer, says, on page 529 of his *Treatise on Bacteria* (2d edition, 1886), as follows:

"In the contents of the intestines, we have found in two cases some dense masses of large round microbes of about 1mm., unequal in size, near which there always exists a yellow or brown pigment."

On page 527 of the same work he shows a drawing of the vein, showing a uriniferous tube containing some pigment, and some small masses elongated and colored. Messrs. Finlay, J. Jones, and many physicians who have followed me in my investigations, attest with me the existence of the pigments, both yellow and black, during the microbe culture. This, therefore, whether we wish it or not, is a fact acquired for science, and which explains in a satisfactory manner the yellow tinge—the brown and black shade of the matter vomited by yellow fever patients.

As to the existence of the micrococcus in all the well proven cases of yellow fever, I present (if perchance my affirmations are not deemed sufficient) those of Drs. Finlay, of Harvard, and of Matienzo, of Mexico (see *Dict. de Geog. Med. de Bordier*, 1884). Babes himself, who examined the kidney and liver tissue of persons who died of yellow fever (see *Compend. de la Acad. des Sciences*, Sept. 17, 1883); Girerd, Surgeon-in-Chief of the hospital at Panama; Delagado, assistant of Finlay; and Rangé, first class surgeon of the French Navy, have also made experiments which prove the transmissibility of this malady by means of cultures injected into animals. Maurel, also navy surgeon, communicated to the Society of Biology a note confirming our researches. Rebougeon, who made complete studies at Rio and Paris on this subject.

Let us add to the testimony of these witnesses that of the Brazilian doctors, such as Drs. Cominhoa, father and son, A. Cæsar Philidory Chapot, Professor of Histology at the Faculty of Rio; Doria, and latterly Lacerda, who presented before a Medical Congress at Rio, in 1889, some preparations of microbes exactly like mine, and thus they have been proved by a comparison between them; and let us ask if the denials of our contradicators can oppose so large a number of earnest opinions.

Another very important point concerns the elaboration of correlative ptomaines with the morbid process. Such ptomaines or leucomaines are

the result of the attack of the microbes on the albuminoid matters of the serum and of the blood. These are toxic bodies, whose formation explains several symptoms of the yellow typhus, or yellow fever.

Be it permitted to me to recall that I was the first to indicate the action of the yellow fever microbe on the proteid principles of the blood, and to attach thereto the symptomatic results of their presence.

It is true that before me the presence of analogous alkaloids in certain diseases had been pointed out; however, said observations were confined to the simple statement. I went further, for I interpreted the presence of these toxic bodies, regarding them as correlative with the organization, development, and multiplication of the micro-organisms after the manner of general ferments, and I have established their influence in producing the characteristic symptoms of the most advanced degrees of the malady; employing a method analogous to that of Marino Zuco, I have extracted from the black matter vomited, two liquid ptomaines and another in the form of gas; one of the liquids, an alkali, is soluble in ether, the other is insoluble in it. The latter, mixed with water, forms a milky emulsion. Both absorb oxygen from the air, and after awhile become thick and resinous.

The ptomaine soluble in ether is oily, acrid in odor, inflammable, giving thick smoke on the approximation of a glass rod dipped in chlorhydric acid. It turns litmus—a deep blue.

Its composition per centum is carbon, 20.976; hydrogen, 15.098; nitrogen, 63.926.

The ptomaine insoluble in ether is more dense than the preceding soluble in water, and in alcohol it does not precipitate by tannin, while the former will precipitate by that reagent.

The gas transformed to a salt, gives all the reaction of an alkaloid. It does not give the Prussian blue, by the test of Boutmy and Brouardel.

These three alkalies are poisons. The gaseous ptomaine killed several frogs by producing analgesia and hemiplegia on the side opposite to that of injection.

The liquid ptomaines being injected into the veins of dogs produced remarkable disorders, affecting the functions of the pneumogastric nerve and those of great sympathetic, and besides exercising a special action on the peripheric filaments of the sensitive nerves. (See, for a full account, the communications by me presented to the National Academy of Medicine of Rio, 1885; also my book, "Doctr. Yellow Fever Microbes," 1883, Rio.) Of the treatment of the yellow fever, I will state that formerly the doctors only employed a symptomatic medication.

After I became convinced of the parasitic origin of the disease, I proposed a medication acting directly upon the etiological element. I have employed the salicylate of soda, either internally in doses of four, six, eight, ten, and twelve grammes in twenty-four hours, according to the case, or hypodermically, from thirty, forty, to fifty centigrammes to one gramme in watery solution. This treatment, after much opposition, which I have had to overcome, is to-day generally adopted by the doctors of my country. It gives magnificent results if employed at the outset of the malady. It is contraindicated in the adynamic period.

Dr. Donovan, of Jamaica, also prescribes salicylate with great confidence, as does Dr. White Walls, of the United States.

Latterly, my distinguished confrere, Dr. Wolfred Nelson, of New York, formerly of Panama, Central America, sustained by valuable considerations, counsels an acid treatment against the yellow fever, considering that the acids are unfavorable to the microbean evolution. Let my clear-headed confrere try his medicament on a large scale, for I find his ideas logical and happy.

During the epidemic of Campinas, Brazil, Dr. Angelo Simoes employed water saturated with chlorine, in doses of thirty grammes to three hundred grammes of distilled water. He reserves this for the later stages, preferring the salicylate in the first. This treatment merits a trial, like all others which aim to attack a malady through its own cause.

The prophylaxis of yellow fever was once treated at haphazard. You could choose as many prophylaxies as there were theories respecting the epidemic. To-day the thing is different; we know the place to attack. It is perfectly well known to be a contagious infection. Disinfectants and quarantines are the usual means which are to be perfected for general safety. We regard the quarantine system elaborated by Dr. Joseph Holt, of New Orleans, as the most efficacious. With advantage on this subject can be consulted Dr. Joaguire Cominhoa's inaugural thesis, Rio, 1886, and "Olyntho Magalhaens," Bahia, 1887.

This is also judiciously recommended by Dr. Urias in a letter which I have published this year in a pamphlet, "Statistics of Vaccination against Yellow Fever during Epidemics; 1888-9." *The vaccination with attenuated virus of yellow fever by the Freire process is the most powerful hygienic resource known for the extinction of yellow fever epidemics in Brazil.*

All other means proposed to protect the health of large cities will be found useless and inefficacious without this vaccination. While having the merit of diminishing the outbreaks, they cannot prevent the attacks unless the vaccination is general, but can act in concert with it.*

Since 1883, I have employed anti-yellow fever vaccination with the most complete success, and the results are all duly authenticated by numbers of our confreres, and bright intellects of the highest repute will not doubt all these witnesses and such valuable testimony, all inspired by truth.

The attenuation of cultures is obtained by the following process: You take a drop of blood from a viscera (liver or kidney in preference) from a patient recently deceased of yellow fever, well confirmed case, or even from a well filled vein of a party who is moribund of the same malady; the drop is used as a culture in a tube of nutritive gelatine or peptonized agar jelly. When the colonies become well developed with the proper characters of evolution and purity, you pass onward by means of a first transplanting of a portion of this culture taken on the point of a platinum wire to a large balloon containing alkalized gelatine. We shall have the kind of micro-organisms of the first degree, which are the most energetic.

A drop of the first transplanting being sown, after the gelatine has totally liquefied, in another balloon containing the same substance, we shall then have a culture of the second degree, less energetic than the former; continuing these transplantings, we shall obtain cultures of the third, fourth, fifth, and sixth degrees, whose intensity will more and

*Page 84, Opus Cit.

more diminish. This rapid and easy method is preferable to the method of successive transmissions from animals, a long process and of more difficult execution. Drs. Ottoni, Caminhoa, Junior, and myself prepared last year some considerable quantity of vaccine by means of the first method, sufficient to serve for three thousand vaccinations, whose results were excellent, as we have already published.

The phenomena arising from the inoculation of these cultures (I generally use those of an intensity less than the third degree) are such as characterize the first stages of mild yellow fever, as has been attested by a large number of doctors (see statistics, 1888 and 1889), that is, pains in the limbs, severe pain in the spinal region, fever, temperature 38 degrees, 39 degrees, and even 40 degrees, cephalalgia, and sub-orbital pain, nausea in some cases, though more rare, vomiting, and the jaundice color, partial or entire. All these phenomena disappear without any treatment at the end of twenty-four to forty-eight hours.

The inoculation is made by means of the Pravaz syringe in the deltoid region; dose for adults, one gramme; children between ten and fifteen years, one third of a gramme; children between five and nine years, one third of a gramme; children under five years, one fourth of a gramme.

Locally, you observe hyperæmia, then a saffron yellow stain sometimes covering the entire arms.

I have already inoculated more than eleven thousand persons. Here is a brief table:

1883-84.....	418 persons.
1884-85.....	3,051 persons.
1885-86.....	3,473 persons.
1888-89.....	3,576 persons.
1889—to date in 1890.....	500 persons.
Total.....	11,018 persons.

I shall shortly publish the details of late statistics.

The mortality among the inoculated was .4 per cent. If we calculate the mortality, taking for normal the rate established by Jemle, in Senegal, we find the figure 66.6 per one hundred, not of .4 only, as when protected by the inoculation. The greater part were children, foreigners recently arrived, and not acclimated, nearly all being in the best receptive condition. Right alongside of them several thousand persons, who had not been inoculated, fell sick and died. Any one desirous of convincing himself will read (I trust, impartially) my works following, wherein are full statistics and all possible details:

1. Doctrine of Yellow Fever Microbes. 1883.
2. Vaccination of Yellow Fever.
3. Statistics of Vaccinations. 1885-86.
4. Statistics of Vaccinations during Epidemics. 1888-89.

Dr. Gaston's article of Atlanta, Ga., in the Journal of American Medical Association, can also be consulted with advantage. The facts there stated are so eloquent that he who would dispute them must be blinded by ignorance or passion, for figures are stubborn facts.

I invite the attention of Governments to my statistics, and venture to recall the resolution offered by the Ninth International Medical Congress at Washington in 1887, which recommended my labor to the protection of the nations. It is time to deliver humanity from one of the greatest of scourges. The effect would be a political good by pre-

senting a barrier to contamination among the nations of France, England, Belgium, Spain, Italy, Portugal, in fact, among all the countries of Europe, as many citizens of each of them die annually in the Americas of this frightful malady; moreover, we have a remedy in our hands, whose efficacy is thoroughly attested by well known physicians and persons of high social standing. I am unable to understand why we remain with folded arms before the hetacombs of yellow fever victims. Let us hope. Let us never lose faith. For myself, I am ever with the unfortunate victims, ready to help, ready to work for them, to claim their rights to life and to health.

I rely on the services of my friends everywhere, the world over, that my voice and my efforts shall everywhere be heard. A just cause ever triumphs. The victory will assuredly be ours.

RIO DE JANEIRO, BRAZIL, June 18, 1890.

SANITATION IN LOS ANGELES.

By D. G. MACGOWAN, Health Officer.

The Board of Health of the city of Los Angeles consists of five members: Hon. Henry T. Hazard, Mayor; Edward T. Wright, C.E.; Martin Hagan, M.D.; John H. Davisson, M.D.; Joseph Kurtz, M.D.

The executive force consists of a Health Officer and four Sanitary Inspectors, a Superintendent of Street Sprinkling, a Police Surgeon, and a Keeper of the Smallpox Hospital. The town has been free from all epidemic disease for more than a year. The Board has under its immediate control the sprinkling of the streets, the removal of the garbage, the removal of dead animals, and the keeping of the receiving hospital and the smallpox hospital. The department has expended directly for sanitary purposes about \$56,750 from September 1, 1889, to September 1, 1890, distributed as follows: Street sprinkling, \$31,550; removal of garbage, \$17,500; erection of receiving hospital, \$700; Health Office expenses, \$7,000.

The population of the city of Los Angeles, following the last census report, is about fifty-one thousand. The city covers thirty-six square miles of territory, and contains about two hundred and forty miles of streets, eighty miles of which are graded, graveled, and curbed, and about nine miles paved with bituminous rock, granite blocks, or finely-broken porphyry. Aligning these streets are seventy-five miles of paved sidewalks; the material used in laying them consists of cement, asphaltum, or granite. This work of paving has been principally done during the past three years, and represents an expenditure of a little more than \$1,000,000.

The first public sewer was laid in 1869, and consisted of a wooden drain which emptied into the city irrigating ditch. Soon after, in 1872, a partial interior system on certain of the main business streets was planned and laid, the material used being brick or cement, as best suited the fancy of the property owners. Some of these old cement pipe sewers are still in use and are in good condition. This system has been greatly extended during the past four years, until now twenty-five miles of the graded streets contain sewers of the best modern type and construction. All of the internal sewers recently laid have been constructed under the Vrooman Act, the materials used being vitrified salt-glazed pipe, with manholes of brick and iron, and the head of each lateral being provided with a one hundred and fifty-gallon flush tank.

These all connect with the San Pedro-Street outfall. At the southeast angle of the city limits this water is taken by the South Side Irrigation Company, and conducted through a twenty-two-inch cement pipe a distance of six miles to the sandy plains below the town of Florence. Though eagerly taken at first by the Chinese market gardeners for irrigating and enriching their truck patches, its prolonged use has been found to be a detriment, lessening the productive qualities of the land when it becomes well saturated with the sewage matters. It is a fact

that lands upon which it has been used constantly for several years have been abandoned by their cultivators, or it has been necessary to pipe pure water upon them to take the place of sewage for the purpose of irrigation.

It is eventually intended that each street shall contain a sewer, and to expedite their construction within a year, the city has voted \$374,000 in bonds for the purpose of constructing intercepting sewers to receive the discharge from the two hundred and seventy-four miles of internal sewers.

Some of these intercepting sewers are constructed of salt-glazed vitrified pipe, and the others of brick, built egg-shaped. They center at the southwestern angle of the city limits, and necessitate the construction from this point of a brick outfall five feet in diameter, whose eventual point of discharge will be the ocean in the neighborhood of the mouth of Ballona Creek, seventeen miles from the city.

Outside of the district already sewered the use of cesspools is universal. In the majority of instances these have not been constructed long enough to be offensive or prejudicial to health. On the plains the character of the underlying soil, a coarse, loose gravel, is favorable to the absorption of the waste waters and other materials discharged into the wells and vaults. In the hilly sections, however, considerable difficulty has been met with on account of the closeness of the bedrock to the surface. The records of this office show one remarkable thing, which is, that they contain the report of no case of diphtheria originating in a house connected with the public sewer system. Following the hint derived from our books, after several careful inspections of every cesspool, kitchen sink, and vault in the town by the department's Inspectors, and a careful direction of the attention of the public to these matters, together with the establishment of a state of minor quarantine in all reported cases, we are rewarded by an absolute eradication of diphtheria in our city, a case being now but rarely reported to us.

All streets accepted by the city as graded streets are sprinkled at the expense of the city. Of such there are about eighty miles. In the warmest weather it is found that this extent of street surface can be sprinkled twice a day by the use of about fifty-seven teams. These teams, with a driver, are furnished to the city at the rate of \$2 70 for a working day of eight hours. Recently the Board of Health removed the sprinkling carts from all streets paved with bituminous rock, being satisfied, after a year's comparison of the paving on Broadway, which was left unsprinkled, with the rest of the paved district, that sprinkling this pavement destroys it by rotting it where the water collects upon its uneven surfaces.

At present the garbage is removed and buried in a sandy district, remote from the center of the city. A thoroughly modern reverberatory crematory is being erected for its destruction by the contractor. The erection of this crematory has been the fruitful source of litigation, but we think we have finally disposed in the Courts of all legal hindrances to its completion.

THE ETIOLOGY AND PREVENTION OF TUBERCULOSIS.

By GEORGE MARTIN KOBER, M.D., Fort Bidwell; Modoc County correspondent.

From Dr. Billings' report on the mortality and vital statistics of the United States, as returned at the tenth census (June 1, 1880), we learn that consumption stands first upon the list of the principal causes of death; it caused twelve thousand and fifty-nine deaths in every one hundred thousand from all causes during the census year. In his Cartwright Lectures, the same author shows that the death rate from consumption, at twenty years of age and over, was 217.64 in every one thousand of deaths from known causes.

Statistics of consumption include, almost as a rule, only those who die with lung manifestations, and nothing is said of the children and others who fall victims to the tubercular meningitis, peritonitis, and other tubercular inflammations. The reports of our State Board of Health for the past twelve months show that consumption caused one thousand seven hundred and twenty-one, or, nearly one sixth of all the deaths, or an average of one hundred and forty-three deaths per month in an estimated population of seven hundred and thirty-one thousand one hundred and twenty-four.

Tuberculosis not only leads the list of diseases in order of frequency and mortality, but the loss entailed by the long duration of the disease, and the danger to others from infection, renders the subject of importance from an economic as well as a medical point of view.

The State Board of Health, through its accomplished Secretary, Dr. G. G. Tyrrell, performed, therefore, a sacred duty in calling the attention of the profession and the public to the contagiousness of this disease, and the undesirability of inviting its victims to this coast to breathe our pure air. It is strange, but true, that in pointing out the danger to life, health, and wealth, incurred by the promiscuous mingling of consumptives with healthy persons, the Board should have been attacked by heartless or thoughtless speculators, and even members of the profession, whose ignorance of well established conclusions is painfully apparent. Let us see what the one thousand seven hundred and twenty-one deaths from consumption amount to from a financial point of view:

If we assume the average duration of the disease to be two hundred days, and that \$2 per day is expended for treatment, care, and loss of work, the one thousand seven hundred and twenty-one deaths involve a loss of \$688,444 per annum, not to mention the losses and danger involved from infection to other members of the family. But does the average citizen of California care nothing for his descendants in the race of life? Would a stock raiser care to import diseased stock, however well bred? No; it would not pay him. Then, why should this glorious State be stocked with consumptives and their offsprings? Simply because we can sell a few town lots? If so, it will never pay, and the sins of the speculator "will be visited upon his children and children's children." For instead of this State producing a people with mental and bodily

vigor, courage, presence of mind, grace, and dignity, we shall have a race weak in mind and body, and deeply tainted with the predisposition to consumption.

In view of the importance of the subject, I have collected the following data from reliable sources regarding the contagiousness of consumption:

The classical researches of Koch² have established, beyond a doubt, the infectious character of tuberculosis in animals and man, whether observed in local tubercular deposits or in acute miliary tuberculosis, and that the disease is everywhere caused by a specific microbe, the *Bacillus tuberculosis*.

This bacillus has been found in the system and in all tubercular deposits, and under a high power of the microscope may be seen to consist of small, usually curved rods, which readily undergo spore-formation. A pure cultivation of these bacilli, when introduced into the body of a healthy animal, produces the disease in question.

The tubercle bacilli have not yet been observed in the soil, water, or atmosphere. Cornet,³ however, demonstrated their presence in the dust and on the walls of rooms inhabited by consumptives, and he, as well as Cadeac and Malet,⁴ successfully inoculated the germs thus found into healthy animals. Since the breath of tuberculous subjects does not contain the bacilli, we may assume that when found in rooms they originate from the sputa of patients, carelessly expectorated upon the floor, walls, carpets, etc., and which, after desiccation, becomes a constituent of the household dust.

The bacilli have also been found in the *milk* of tuberculous mothers and cows, especially when the lacteal glands were the seat of the disease, or the system infected with general tuberculosis. This last remark also applies to the presence of the bacilli in the *flesh* of animals used for food; they have also been found in the *blood* of those affected with acute miliary tuberculosis, but only in limited numbers.

Villemin states that the contagious principle has also been found in the *feces*.

According to Uffelmann,⁵ the tubercle bacillus is an obligate parasite which does not develop in the ordinary culture media, but is best propagated in blood serum, glycerine agar-agar, at a temperature of 99 degrees to 100 degrees. If the temperature is below 50 degrees or above 108 degrees, they cease to grow. The resistance of this germ to external influences, especially to heat and cold, is very great. Sormani⁶ has shown that it requires from fifteen to twenty minutes exposure to steam under pressure, or the same length of boiling, to destroy the vitality of the spores. This same author has demonstrated that completely dried and pulverized sputum retains its infectious character for weeks and months; and Pietro⁷ asserts that tubercular matter will retain its virulence ten months after drying. Putrefaction, so destructive to many bacterial forms, exerts very little influence upon the tubercle bacilli. Sormani and Voelsch⁸ claim that the vitality of the spores remained unimpaired for one hundred and eighty days in the putrefied sputum of consumptives. DeToma,⁹ however, denies this, and found that putrefaction destroys the virulence of the germs after three to nine days.

The experiments of Wesener and Falk¹⁰ appear to indicate that the bacilli of tuberculosis resist the action of the normal gastric juice.

There is much evidence to show that in man the disease is most

likely set in action by the bacilli introduced by the respiratory passages, or the digestive tract, and by the skin and mucous membranes, especially if there be a solution of continuity.

The experiments of Koch, Weichselbaum,¹¹ and others prove that artificial tuberculosis can be produced in animals by inhalation of a spray containing tubercle bacilli, by feeding animals with tuberculized food, or subjecting them to direct inoculation.

The evidence as to the transmissibility of bovine tuberculosis to man has been strengthened by Demme,¹² who reports four cases of intestinal tuberculosis in children, infected by the milk of a tuberculous cow, and adduces chemical and anatomical proof of his assertion. When we consider the large mortality of children under five years of age from primary tubercular ulceration of the intestines, tubercular peritonitis, and tabes mesenterica, and the fact that the food of these children consists largely of unboiled milk, we are strongly tempted to believe in the transmission of bovine tuberculosis through the milk supply.

Other modes of infection have been reported, viz.:

Loewenthal¹³ reports the case of a woman who slept on the right side of a tuberculous husband, and contracted a conjunctivitis of the left upper eyelid, followed by enlargement and ulceration of the glands in the parotid and submaxillary region. Excision of the original deposit revealed the presence of tubercle bacilli.

Cornil and Moore¹⁴ have shown that infection may take place through the genital mucosa, and an interesting article on chronic tubercular endometritis, referring to primary genital tuberculosis and sexual relations with tuberculous husbands, will be found in the New York Medical Record, November 30, 1889.

Lehmann¹⁵ reports ten cases in which the virus was transmitted by the mouth of a tuberculous Rabbi, who was in the habit of applying suction to the wound after circumcision. In these cases at the end of the second week ulcerations with a gray base were noticed at the point of infection; four of the children died shortly from tubercular meningitis; three others after a more prolonged illness; one died from diphtheria, and two recovered.

Eisenberg¹⁶ reports a similar case, in which the sputum of the Rabbi was found to contain the bacilli. Tehernig, Pfeiffer, and Duering have reported instances of infection through the skin, in one case by means of expectorated phthisical blood, which infected a slight hand wound of a girl. Landouzy and Martin¹⁷ have shown that inoculation of the spermatic fluid from tuberculous guinea pigs produced the disease in one third of the animals experimented upon. This would seem to render the transmission of the disease through the sperma highly probable.

From what has been said and written on the subject, it is evident that the tubercle bacilli must be widely scattered; the modes of invasion are also numerous, and the wonder is that, relatively, only a few of those exposed to the virus actually contract the disease. This shows that invasion of these microbes is not sufficient to produce the disease, but they must also find a susceptible subject for their proliferation and pathogenic effects.

The question of susceptibility in this, as in other infectious diseases, evidently plays an important role. But what is that state of the body which renders it peculiarly liable to be affected injuriously by this morbid agent? Is it a weakness of the organisms, a diminished power of

resistance, or is it a peculiarity of the tissues, more especially of the cells, which places them at a disadvantage in their struggle against the invasion and effects of these bacilli? Is it the addition or subtraction of a certain something in the blood which furnishes a suitable pabulum for their growth? These are difficult questions to answer.

Clinical experience indicates that faulty nutrition, debility, loss of blood, anæmia, mental anxiety, diabetes, whooping-cough, measles, and other diseases, favor the development of tuberculosis. We also know that a predisposition may be inherited, as evidenced by a delicate physique, narrow chest, and general vulnerability of the tissues.

A vulnerability of the tissues to the disease may also be acquired by dust-producing occupations, and here the origin of the dust seems less important than the character of the particles which compose it. For this reason, no doubt, the hard, sharp, and angular particles of iron and stone dust are more liable to produce lesions of the respiratory mucosa, thus favoring the invasion of the bacilli. In no other way can we explain the comparative innocuity of coal dust, the particles of which are quite free from sharp points and corners. Dr. Ogle has shown in his report, in forty-fifth annual report of the Registrar-General, that coal miners stand at the head of the list as regards freedom from phthisis and other lung diseases, in dust-inhaling occupations. We know, of course, that occupations involving the inhalation of an unusual amount of dust tend to produce diseases of the lungs; not necessarily tubercular, but what I wish to emphasize is, that certain dust particles are apt to cause lesions of the respiratory mucosa, and hence an increased susceptibility to the invasion of the tubercle bacilli.

Uffelmann believes that what we call inherited or acquired predisposition to tuberculosis may amount, in many instances, only to a local predisposition of the respiratory passages, a weakness of the membranes, and greater vulnerability, and refers to the fact that some individuals, otherwise healthy, show a greater liability to laryngeal and bronchial catarrhs, and later to tuberculosis, whilst in others repeated attacks of tonsillitis predispose to diphtheria.

The observations of Dr. Bowditch, of Boston, and Buchanan, of England, positively indicate that damp soils and habitations are predisposing causes to tuberculosis, and whilst this relation has not been satisfactorily explained, still it is possible that the bacilli of tuberculosis luxuriate best in such an atmosphere, as damp rooms are much more likely to contain an excess of organic matter. Another explanation may be found in the well established fact that a damp air predisposes to catarrhal affections, or "colds," and these in turn may render the system more susceptible to the invasion of the tubercle bacilli.

As in other infectious diseases, the question as to whether the germs are introduced *direct*, and in sufficient numbers, is of importance. It would appear that the mere presence in the sick chamber does not convey the virus, but it requires intimate contact, as sleeping in the same bed or room, common use of eating and drinking utensils, mouth to mouth contact, etc.

The observations of Humphrey, Pollock, and Leudet, conclusively show that in well ventilated wards of chest and consumption hospitals, the disease is not usually found to spread.

In private practice the results are different in this respect. A French committee of investigation presents two hundred and thirteen cases of

tuberculosis in which the communicability of the disease was clearly established. In sixty-four of these cases the disease was conveyed from husband to wife; in forty-three from the wife to the husband; in thirty-eight it was transmitted to brothers or sisters; in nineteen from parents to the children; in sixteen to distant relatives; and in thirty-two to outsiders. The communicability was most marked among the poorer classes. Another collective investigation of a German medical society revealed the fact that of nine hundred and thirty-eight married persons who died of acquired tuberculosis, in one hundred and one instances either the husband or wife also contracted the disease. In 8.1 per cent of these cases the husband contracted the disease from his wife, and in 13.2 per cent the wife was infected from the husband. Other statistics might be adduced in favor of the communicability of the disease, but Zasetzky's¹⁸ observation is of special interest. He reports the case of a tuberculous woman who married between 1872 and 1883 three husbands, all previously healthy; the first husband died in 1879 of tuberculosis, the second in 1881, and the third husband, at the time of the report in 1884, was also a victim of the disease, the wife having in the meantime died of consumption.

We can only explain the greater contagiousness in such cases by a more intimate contact, the occupation of the same room and bed, common use of eating and drinking utensils, and the vitiated air of private rooms. It is very possible that the bacilli may acquire more virulent infective powers in the foul atmosphere of overcrowded rooms, and, as suggested by Dr. Ransome, the sporulation of the bacilli may be assisted by contact with the kind of organic matter found in such atmospheres. We will now consider the various ways in which the bacilli are most likely to gain access into the system.

Cadeac and Malet have proved that the bacilli are not contained in the breath of tuberculous patients; we must conclude, therefore, that when found in the air of rooms occupied by phthisical patients, they originate from the dried sputum and other dejections on floors, walls, carpets, bedding, and clothing, which are converted into dust particles, and thus gain access into the air and the respiratory tract. The virus may also be conveyed to others, by small particles of sputum, in kissing, coughing, instrumental manipulations, or adhering to utensils in common use.

Uffelmann believes that the secondary lesions of the alimentary tract may be produced by the patient's swallowing a portion of the expectoration. The most common source of infection of this tract, by means of unboiled milk and insufficiently cooked meat from animals affected with tuberculosis, has already been referred to. There is no evidence to show that the bacilli are transmitted in vaccination; in fact, Acker failed to discover the microbes in question in the lymph vesicles of vaccinated phthisical subjects.

There is much reason for believing that the germs of the disease may be conveyed in clothing. I remember a well authenticated instance where a perfectly healthy man bought the clothing worn by a consumptive, and contracted the disease within six months, and died from the effects two years thereafter. Perlen,¹⁹ in his dissertation on pulmonary tuberculosis and occupation, tells us that of four thousand one hundred and seventy-seven tuberculous patients treated in the Munich Poliklinik, seven hundred and nine were engaged in tailoring, cleansing, and shoe

shops. Whilst these figures are suggestive, it is of course impossible to estimate the number of instances in which the disease was spread by dried sputum contained in clothing.

Does climate afford immunity from tuberculosis? The evidence is not sufficient to show that any community in any climate is entirely free from pulmonary consumption, but we do know that whilst the mortality on the plains and in the valleys of Europe is about three per one thousand, and as high as five to seven per one thousand living in cities and towns, the inhabitants of certain mountainous districts, even under unfavorable sanitary surroundings, suffer to a far less extent—the mortality amounting in some localities at an elevation of fifteen hundred feet, to only 0.56 and 0.68 per one thousand.

Fuchs, quoted by Uffelmann, gives the following elevations as likely to afford immunity from consumption:

In the north temperate zones, at an elevation of.....	1,300– 3,000 feet.
In the middle temperate zones, at an elevation of.....	2,000– 5,000 feet.
In the tropical zones, at an elevation of.....	7,000–14,000 feet.

Bell, in speaking of our own country, refers favorably to the eastern highlands, the Alleghany region of Georgia, the Carolinas, Tennessee, Virginia, West Virginia, Pennsylvania, and the White Mountains, especially the pine forest region of the Atlantic States, from Virginia southerly, at an altitude of from five hundred to fifteen hundred feet, and also the Pacific Coast, as notable regions for the small ratio of deaths from pulmonary diseases. In 1886 I called attention to the climate of Northern California, and the infrequency of pneumonia and phthisis among the inhabitants of Modoc County, suggesting, in my concluding observations, that the great daily range of temperature, dry atmosphere, and elevation (four thousand seven hundred feet) might be fatal to the development of the tubercle bacillus (see Ninth Biennial Report of State Board of Health, 1886). In this connection it is proper to refer to the fact that M. Delargy, in a paper quoted by Dr. G. G. Tyrrell, Secretary State Board of Health of California, December, 1889, points out that certain mountain regions in Europe, formerly exempt from phthisis, have now become infected since intercourse with cities and phthical localities have been furnished, and believes that the presence of phthical patients in the most healthful localities will soon affect the purity of the atmosphere.

We have seen that the elevation affording immunity differs greatly in different zones; therefore, exemption cannot be attributed to the influence of diminished atmospheric pressure alone, although we must admit that diminished density of the air induces deeper inspirations, more effectual inflation and ventilation of the air vesicles, which naturally tend to increase the resistance of the pulmonary tissues to the invasion of the germs. It is possible that freedom from organic impurities in the air is the most important factor. Pasteur, Tyndall, and others have shown that the air of great altitudes is entirely free from organic impurities; and Miquel, Frankland, Petri, and others have examined the air for bacteria at different altitudes, and found the air at an elevation of between six thousand and seven thousand feet to be quite free from germs.

Miquel found in one cubic meter:

1. At an elevation of 2,000-4,000 metres	none.
2. On the Lake of Thun, 560 metres	8.0
3. Near the Hotel Bellevue at Thun, 560 metres	25.0
4. In a room of the Hotel Bellevue at Thun, 560 metres	900.0
5. In the Park of Montsouris, near Paris	7,600.0
6. In the City of Paris (Rue de Rivoli)	55,000.0

Similar investigations have been made of the air of sea coasts and the high seas.

Uffermann found between fifty to three hundred bacteria in one cubic meter of air on the Baltic Coast, in the summer of 1887, and Moreau, Miquel, and Fisher ascertained that the sea air one hundred and twenty miles off the coast is absolutely free from bacteria. These facts throw a flood of light on Bowdin's statistics, which show that whilst the deaths from consumption in the English army were 10.7 per thousand, the mortality in the navy was only 1.76 in one thousand men.

PREVENTION OF TUBERCULOSIS.³⁰

The facts presented in the foregoing pages justify the conclusion:

1. That tuberculosis is an infectious disease caused by a microbe, transmissible to healthy individuals under certain favorable conditions.

2. Inherited and acquired predisposition play an important role in the invasion and multiplication of the bacilli.

3. The germs may enter the system by the respiratory and alimentary passages, and by the skin and mucous membranes, if there be an abrasion.

4. That whilst the bacillus has been transmitted through the milk, flesh, and blood of animals and man, the most common and effective way of distributing the disease is by the dried and pulverized sputum of tuberculous patients. Heller calculates that seven thousand two hundred millions of bacilli may be expectorated in a day by a single patient.

The indications for the prevention of this disease are plain:

The sputum of consumptives should be received in spitcups containing a 5 per cent solution of carbolic acid, and the contents rendered innocuous by boiling for twenty minutes. The paper and wood boxes made for this purpose should be burned. All public and private buildings should be provided with spittoons.

Patients who continue out of doors should use handkerchiefs to receive their expectoration, which, if old, should be burned; at all events, linen, bedding, or clothing thus soiled should not be allowed to dry, but must be thoroughly disinfected, boiled, or steamed.

Notification and disinfection in all fatal cases should be made compulsory, and the rooms in hotels, or elsewhere, where consumptives may take lodging, should be so arranged that thorough disinfection is practicable, and all articles with which the patients have had anything to do should not be used by others until disinfected by steam under pressure, boiling sulphur vapor, or coating with lime or corrosive sublimate solution.

Isolation of tuberculous patients is indicated in hospitals, asylums, and prisons. In private life the patient ought to occupy a separate room and bed, use separate eating and cooking utensils, and neither receive nor give kisses.

Whilst it may be exceedingly disagreeable to be the advocate instead of referee in matters pertaining to "preventive medicine," still it will always be the duty of the family physician to enlighten the public on the nature of infectious diseases and the means for their prevention, until the facts are commonly recognized. Marriages with a tuberculous person should, of course, be discouraged.

Special attention should be given to the meat and milk supply. Compulsory reporting of cases of bovine tuberculosis should be enacted, and the sale of diseased meats and milk prohibited. In the absence of such laws, or as an additional precaution, cow's milk should be thoroughly boiled and meats well cooked. Beef's blood should never be drank, as suggested some years ago. A tuberculous mother should not nurse her infant; and great care must be taken in the selection of a wet nurse.

Predisposed subjects should take special precautions; this is especially true of those born of tuberculous parents, or belonging to consumptive families; those debilitated by privations or excesses, and those suffering or recovering from whooping-cough, measles, smallpox, and diabetes. Scrofula should also be included, but many physicians regard this disease as identical with localized tuberculosis. Clinical experience points to the fact that the blood or tissue cells of all such persons have not the power to resist the incursion and effects of the bacilli, and that it is quite possible to increase this resistance by improving the tone and general nutrition of the system.

Apart from medication, careful and methodical gymnastics, attention to the skin, and other hygienic rules may prove of special value.

The establishment of sanitary boarding schools, in salubrious localities, for children predisposed to tuberculosis, in which special attention is paid to their physical culture, appears earnestly called for.

In choosing a vocation for such persons it is important to avoid occupations involving sedentary habits and indoor work, especially in a dusty atmosphere. Last, but not least, let us insist on the purity of the air in our houses and towns, and guard against damp and unsanitary habitations.

¹ Billings, J. S. Cartwright Lectures, N. Y. Med. Records; December 14, 1889.

² Koch, R. Mittheil.: aus dem k. Gesundheitsamte, II.

³ Cornet. Zeitschr. f. Hygiene, V, 191.

⁴ Cadeac & Malet. Rev. de Medicine; 1887, No. 7.

⁵ Uffelmann, J. Handbuch der Hygiene, p. 530; 1890.

⁶ Sormani, quoted by Uffelmann.

⁷ Pietro, quoted by California Health Board; November, 1889.

⁸ Voelsch, in Ziegler's Beiträgen zur pathol. anatomie, II 2.

⁹ De Toma. Centralblatt f. d. med. Wissen, 1888.

¹⁰ Falk. Virchows archiv, 93.

¹¹ Weichselbaum. Zeitschr. der Wiener arzte, 1883. 2 Heft.

¹² Demme. Jahresbericht des Jennerschen Kinderspitals. Bern, 1882.

¹³ Lowenthal. Impftuberculose der Conjunctiva, 1887.

¹⁴ Moore. Pacific Record; November 15, 1888.

¹⁵ Lehmann. Deutsche Med. Wochenschr; 1886; Nos. 9 and 10.

¹⁶ Eisenberg. Berlin klin. Wochenschr; 1886; No. 35.

¹⁷ Landouzy & Martin, in Verneuil Etudes exper. et cliniques. Paris, 1887.

¹⁸ Zasetzky. Wrutsch; 1884.

¹⁹ Perlen. Lungenschwindsucht und Leruf. München, 1887.

²⁰ American Jour. of Med. Sciences; January, 1890; pp. 78-79.

AN ECONOMIC VIEW OF SANITATION.

By S. S. HERRICK, M.D.

Under this title it is proposed to sustain a claim for public hygiene by mathematical proofs derived from actual results. It will be shown what sanitation has accomplished in the prevention of disease, the rescue of human life, and the conservation of wealth; what room is left for advance in the same direction; and why its cost, as an investment, promises more substantial returns than any other public expenditure.

COST OF SICKNESS AND DEATH.

A very moderate estimate of the value of a human life during the productive period, averaging from twenty to sixty years of age, would be \$1,000 as capital for the production of wealth. About half of the living population fall within these limits, so that the average value of a human life may be set at \$500. The British Board of Health has estimated one hundred and twenty thousand deaths annually from preventable diseases out of thirty-five millions of people in the United Kingdom, and one million two hundred thousand cases of serious preventable sickness. With the value of lives as above stated, and an average cost of every case of illness at \$30, including medical attention, medicines, loss of time, and funeral expenses of the dead, the total loss would amount to \$96,000,000 annually. Dr. J. S. Billings, writing in 1878 on the basis of the United States census, reckoned one hundred thousand deaths occurring annually in this country from preventable causes, and one hundred and fifty thousand constantly sick of preventable diseases. The cost of this needless loss of life would be \$50,000,000; and supposing the average earnings of every person in the productive half of life to be \$1 per day for three hundred working days, there would be a daily loss of \$75,000 in wages, amounting to \$22,500,000 for the year. The care of the sick at 50 cents per diem for three hundred and sixty-five days would amount to \$27,375,000; the cost of the funerals, at \$20 each, would be \$2,000,000; and the total damage to the wealth of the country would exceed \$100,000,000 annually. Allowing for increase in population between 1870 and 1890, the present loss would be more than \$150,000,000.

Dr. J. H. Kellogg, of Michigan, by a different mode of calculation, estimated the annual damage to the United States from preventable disease at not less than \$300,000,000.

Another calculation would reach substantially the same result. It is supposed that for every death in a given population there are two years of sickness distributed among those who die and those who recover, equivalent to seven hundred and thirty days of disability for work. In this country, an average day's labor is worth at least \$1. and half the sick are in the productive period of life. Allowing three hundred working days to the year, every death involves a loss of pro-

duction equal to \$150. The cost of seven hundred and thirty days of sickness for maintenance, medical attention, and medicines, would be moderately put at 50 cents a day, or \$365; the loss of capital for every death would be \$500; and, without counting expense of funerals, the total loss to the community for every death would exceed \$1,000. Therefore, allowing for the whole country one hundred and fifty thousand deaths annually from preventable causes, there is a loss of more than \$150,000,000. If California holds, as is probable, one fiftieth of the population of the Union, her share of the loss would be \$3,000,000; for, though we may claim a lower mortality than the average of the country, this would have an offset by higher wages and capital value of life in the Golden State.

For a single illustration, the yellow fever epidemic of 1878 may be adduced, which prevailed over the greater part of the Mississippi Valley, and which was traced to faulty administration of the quarantine near the mouth of the river. Mr. Keating, of Memphis, estimated its total damage to the valley at not less than \$200,000,000, including the value of eighteen thousand lives lost, the cost of as many funerals, the expense of one hundred and twenty-five thousand cases of sickness, the loss of time and maintenance of fifty thousand refugees, the interruption of productive industries, and more or less permanent diversion of commerce. It is probable that the losses of New Orleans alone during the present century have exceeded the above amount from this single cause, over which modern sanitation may now claim to have won mastery.

HOW MUCH CAN STILL BE PREVENTED AND SAVED.

Notwithstanding the great advances in hygiene and corresponding lowering of mortality in the most civilized countries of the world, especially in the last quarter of a century, sanitarians hold that improved methods are capable of still further reducing sickness and death by one third. It is asserted by Thomas Bond, Assistant Surgeon of Westminster Hospital, London, that, on an average, half the out-patients treated by a hospital surgeon suffer from diseases due primarily to want of knowledge of the laws of health, chiefly in regard to dress, ablutions, and ventilation. Under the preceding head we have seen that the annual loss to the whole country from preventable disease is not less than \$150,000,000. It is fair to presume that efficient sanitary measures in competent hands might in time save most of this enormous expense. It must not be expected that such improvements could be immediately effected. True and lasting reforms in hygiene, as in other matters affecting the public welfare, are largely experimental and must be accomplished gradually.

It is within reasonable bounds, however, to assert that practicable improvements in hygienic methods ought speedily to reduce the mortality one half in such diseases as erysipelas, smallpox, scarlatina, diphtheria, typhoid, puerperal, and the malarial fevers; and one fourth in pulmonary consumption, measles, whooping-cough, diarrhœa, dysentery, cholera morbus, and cholera infantum. Such would be the effect of thorough drainage and cultivation of the eucalyptus globulus on wet lands; of the destruction of the contagious products of diphtheria, pulmonary consumption, typhoid fever, and the diarrhœal diseases, and the isolation of those affected with contagious diseases. Dr. H. B.

Baker, Secretary of the Michigan State Board of Health, avers that it is practicable to reduce the sickness and mortality of his State 10 per cent by improved sanitation.

EXAMPLES OF RECENT SANITARY GAINS.

It has been asserted by Mr. Schultz, of New York, that quarantine restrictions at that port, interrupting traffic in furs and hides during the summer months from 1822 to 1840, entailed a loss of \$100,000,000 to manufacturers and consumers—a sum sufficient to support all the Health Boards in the country. This loss, however, was less than would have resulted from the admission of yellow fever, smallpox, and cholera. Under improved quarantine methods the impediments are so far removed that this traffic suffers no serious damage. The amelioration of traffic in other commodities is to be added to the above estimate, and this is then to be increased by due allowance for other ports. These increments would more than double the amount, aside from the fact that the foreign commerce of the country has more than doubled since 1840. It is therefore probable that improvements in quarantine methods since 1822 have resulted in a saving of at least \$25,000,000 annually to the commerce of the country, for no reasonable person would say that quarantine was needless.

The following table shows the hygienic advance made in several European countries between 1865 and 1883:

COUNTRY.	RATE OF MORTALITY PER 1,000.			
	1865.	1875.	1882-3.	Gain in Seven Years.
Bavaria	30.7	31.4	23.5	2.9
Italy	29.8	30.7	27.4	3.3
France	23.6	23.7	22.2	1.5
Belgium	26.5	22.7	20.8	1.9
Switzerland	—	24.0	20.3	3.7
England	23.2	22.2	19.6	3.2

In sanitation Great Britain holds undisputed precedence. The civil registration of vital statistics began in 1837. The annual death rate of the period 1837-71 was nearly stationary—about 22.3—except when temporarily augmented by influenza or cholera. The Public Health Act went into effect in 1872, and was amended in 1875. The sequence in mortality is thus exhibited:

Mean death rate per 1,000, 1871-75	22.0
Mean death rate per 1,000, 1876-80	20.8
Death rate per 1,000, 1881	18.9
Death rate per 1,000, 1882	19.6

The decrease of mortality has been greater among females than males. There has been a decline for every decennial period of life in males, except those from 35 to 75, and in females for all periods, except from 55 to 75. Dr. Farr's life table gave the average expectation of life for males as 39.91 years, and for females as 41.85 years. Under the table revised since 1880, it is for males 41.92 years, and for females 45.25. So there has been a gain of 5 per cent for males, and 8 per cent for females, as

acknowledged by life insurance actuaries. Although the male mortality from 35 to 75 years has slightly increased, and that of females from 55 to 75 years, the decrease at earlier periods has been so much greater that, of one thousand persons born alive, there are more survivors at all periods of life now than formerly. Among males 70 per cent, and among females 65 per cent of the increased duration of life come between 20 and 60 years—the productive period of life.

A report to the Privy Council of Great Britain states that in thirteen of the principal towns the average death rate, previous to the introduction of sewerage, was 28.4 per 1,000; subsequently, 23.4. Between 1870 and 1880 the death rate has declined from 24.4 to 22.8 per 1,000.

In the Crimean war the losses of British troops by sickness, due to bad quarters and food and insufficient clothing, were six times those due to casualties of battle. Under improved hygiene, carried out by efficient medical officers, the death rate of British troops in India has been reduced from 69 per 1,000 in 1860, to 17.62 in 1880; and of British troops in Europe, from 17.9 in 1860, to 8.56 in 1880. From cholera the death rate among European soldiers in India was 9.02 per 1,000, annually, in the period 1861–5; in the period 1876–7, .84. In the cholera epidemic of 1876, the death rate among the native population from this disease was 12.12 per 1,000; among native troops, 2.2; and among European troops, 1.85 per 1,000. In India the mean mortality from fevers, 1859–67, was 22.41 per 1,000; 1868–76, 3.29, and in 1876, 1.26 per 1,000. This immense reduction was due much more to preventive than curative improvements.

In Manchester the death rate was three less per thousand in the period 1873–79 than 1866–72, and in Liverpool six less. In 1859 pure water from Loch Katrine was brought to Glasgow, the previous supply having been from the Clyde. In three cholera epidemics prior to 1859, there were more than three thousand deaths from cholera. Since 1859 only sixty-eight have died of cholera, though the population has immensely increased. This sanitary improvement, supplemented by better dwellings, better hospital accommodations, and more efficient control of epidemic diseases, has reduced the death rate 11 per cent in twelve years. Besides, Edinburgh has eliminated 14 per cent of her mortality; Dundee, 12 per cent, and Aberdeen (having previously a low death rate), $3\frac{1}{2}$ per cent. The leading English cities and towns show a less marked, but uniform gain in vitality.

The annual saving of children's lives in England since 1860 is estimated at ten thousand, due to purer air and water, better housing, food, and clothing, and more intelligent care. The deaths from continued fever were one thousand one hundred per one million persons living in 1865; and four hundred in 1880. Since vaccination became compulsory, deaths from smallpox average two hundred and sixteen per one million, annually; about one fourteenth of what occurred in the last century.

At Vienna, in 1872, typhoid fever caused six hundred and thirty-five deaths, and in 1873, six hundred and forty-nine deaths. A new water supply was followed by a reduction to three hundred and fourteen deaths from that cause, which was still further lowered to sixty-nine in 1884, to eighty in 1885, and sixty-one in 1886.

The "Metropolitan Association for Improving Dwellings of the Industrious Classes," in London, has erected one thousand and sixty houses,

having accommodations for five thousand three hundred people. During the eight years prior to 1875, the mortality in these houses did not exceed fourteen per one thousand, while the general rate in the metropolis at the same time exceeded twenty-four per one thousand, though the improved houses contained an unusually large proportion of children.

The following attempts in household and town sanitation in this country will serve as models: "The Association for Improving the Dwellings of the Poor in New York City" has built a block of houses on First Avenue, which accommodates two hundred and eighteen families at a moderate rental. They are provided with reading-rooms, a bath house, and an ample playground for children. The plumbing was not faultless, but in 1882 the death rate among the children in this block was six per one thousand, while it was twenty-eight per one thousand in the neighboring houses. The city of Pullman, located on a level plain twelve miles from Chicago, was founded by the well known inventor of the sleeping-car, in 1881. The fact that its sewage farm more than paid expenses and interest on cost within two years, proves that the management has been according to business principles. In two years its population had grown to seven thousand five hundred, and for this period its death rate was 6.9 per one thousand, annually. At the same time, the death rate of the adjoining village of Hyde Park and some contiguous rural territory, was fifteen per one thousand, annually. But the advantage of these enlightened sanitary improvements accrue not merely to a lowering of sickness and mortality, with their attendant impoverishment and grief. With greater conveniences of life and more cheerful environment, we find more leisure for social enjoyment and content, the summit of happiness.

SANITARY CONDITIONS OF EARLIER TIMES.

On this point I cannot do better than to quote *in extenso* from an address by Prof. S. E. Chaillé, M.D., of New Orleans. His statements are based on authentic history:

Mankind must not be permitted to forget what were the conditions of their existence about three hundred years ago. * * * Then the "black death," the plague, the sweating sickness, the jail fever, scurvy, smallpox, syphilis, and other virulent diseases, caused such frightful ravages that this generation may well stand aghast. The blessings due to the total disappearance or great diminution of these diseases are inestimable. * * * Our best historians report that, at that period, the vast majority of our ancestors—namely, the common people—were subjected to the following conditions of existence:

War, Famine, and Pestilence.—Incessant wars increased the frequency of famines; these aggravated pestilences; the poisons of these, scattered broadcast by those unsurpassed diffusers, marching armies and marauding soldiers, produced a pandemicsity and continuity of spreading diseases to an extent which kept the people wretched, degraded, and "thinned out."

Wages.—Macaulay states that, only two hundred years ago, after great social progress, the wages of the common people in England barely averaged \$1 to \$1.50 per week, without board; that nearly all the prime necessities of life were dearer then than now; and that one fifth of the total population were helped to live by the public poor-rates.

Malaria in the Country.—England had fens forty or fifty miles in length, reeking with miasm and fever, and inhabited by "ague-stricken peasants."

Streets.—In towns the streets were filthy beyond expression. After nightfall a passenger went at his peril, for chamber windows were opened and slop pails were unceremoniously emptied down. The streets were infested with swarms of domestic animals; were destitute of lamps. Some were only six feet wide, and many were too narrow for a cart to pass. Crooked, unpaved, filled with rotting vegetables, animals, and offal, they were "very unsavory as well as very filthy."

Houses.—The houses of the common people were "made of reeds or sticks, plastered over with mud." "The fire was chimneyless," and from the fireplace "smoke escaped as best it could, without the help of chimneys, for these, though introduced in the twelfth century, were but slowly acclimatized." The dark, ill-planned houses, cut off from fresh air and sunlight, had "no windows of glass, nor even of oiled paper," and it was not

until the first half of the eighteenth century that house ventilation began to excite some attention. The rooms had mud floors, "covered with straw, sedge, or reeds, and rarely with tiles or slates." Even of the palace of Greenwich it is stated that, "though fresh rushes were supplied from time to time, there would remain, sometimes for twenty years together, a substratum of the most nauseous and disgusting description, and it appears from earlier accounts and from certain civic restrictions and regulations, that this loathsome mess was at length turned out into the narrow streets, to be consumed by dogs, cats, pigs, and poultry, or imperfectly washed away by the rain." In the country "houses, stables, and offices were under one roof," and even the country gentleman had "the litter of the farmyard gathered under the windows of his bed-chamber." "The prisons were hells on earth—seminaries of every crime and every disease." Filled in the largest part with debtors, these were so crowded together that an allowance of only one hundred and fifty cubic feet to each was common. No bedding—not even straw—was provided, and those who procured straw often used it until "almost worn to dust," while "some laid on rags, some on the bare floors. The prison-rooms were without fireplace or sewer, and so extremely offensive that those who tarried in them stunk for hours. In fine, the crowded debtors' prisons presented an unparalleled combination of physical and moral evils—a seething mass of crime, misfortune, low vice, and debauchery," and so continued until John Howard's day—about 1774.

Bedding and Clothing.—The common people slept on piles of straw, on straw pallets or rough mats, and even the townsman's "bed was a bag of straw, with a fair, round log for his pillow." "The sheep's skin was in common use as clothing," but, "if a man was in easy circumstances, his clothing was of leather, while if poor, a wisp of straw wrapped around his limbs kept off the cold." "Vermin abounded in the clothing and beds." Only in modern times, and by very slow degrees, did "articles of cotton and linen come into use as clothing worn next to the skin, easily cleaned and readily changed, and soap, soda, and potash find their way into every house as abstergers." In those good old days personal uncleanness, even a religion with some, was unavoidable with the many, so that even the plumed knights and noble gentlemen (so often envied by the callow youths of our day) were forced to resort to the strongest perfumes to enable them to endure a congregation of themselves.

Diet.—"There was no commerce to put off famine," which frequently occurred. "The common food was pease, vetches, fernroots, and even the bark of trees." If the rural population were "able to procure fresh meat once a week, they were considered to be in prosperous circumstances; and one half the families in England could hardly do that." The chief animal food was salt meat. Rye bread was used instead of wheat; vegetables were uncommon articles of food; and even the potato was very slowly introduced by modern civilization. Drunkenness in England was universal; to drink until literally "under the table" was a common habit. Only within recent times, and very slowly, have tea, coffee, chocolate, and tobacco been introduced into common use, supplanting in some measure the excessive abuse of beer and ardent spirits.

Licentiousness.—The fearful spread of syphilis demonstrated the secret wickedness of society and the frightful immorality of the times. "If contemporary authors are to be trusted, there was not a class, married or unmarried, clergy or laity, from the Holy Father Leo X. to the beggar by the wayside, free of it." "To so great an extent had these immoralities gone, that it was openly asserted that there were one hundred thousand women in England (when the total population was only five million) made dissolute by the clergy; and it was well known that brothels were kept in London for their use." * * *

Crowding.—As wars were constant, armies, which have always proved to be the crowds best adapted for diffusing epidemics, were ever in motion. "Cities were crowded fortresses, narrowly built, kept in a filthy state, and surrounded with stagnant ditches." * * *

An historian teaches that, for the common people, the only physician was the monk with his crucifix, and that the only sanitary provisions were the *paternoster* and the *ave*. * * * Macaulay says that the difference between London in the seventeenth and in the nineteenth century "is very far greater than between London in an ordinary season and London in the cholera."

In the middle of the sixteenth century the average duration of life in London was twenty-five years, and the annual mortality about eighty per one thousand. It is probable that it then enjoyed, as it does at present, the distinction of being the first among large cities in sanitation, as well as in health and longevity of its citizens.

EPIDEMICS AND MORTALITY OF FORMER AGES.

In ancient times pestilential diseases were destructive to a degree unknown in modern days. According to Plutarch, the Assyrian army lost one hundred and eighty-five thousand men in one night, at the siege of Jerusalem. Herodotus relates that one hundred and fifty thousand of the army of Xerxes perished in a few days. The bubonic plague reigned

over Asia, northern Africa, and Europe, from the fourth century, retiring from eastern Turkey in Europe about 1840, and reappearing in the valley of the Volga for a brief visit since 1870.

In the middle of the fourteenth century, as the Black Death, it destroyed thirteen millions in China and twenty-five millions in Europe. In 1665 it is said to have carried off three thousand in one night in London.

Smallpox was carried to Mexico in 1520, and, according to Robertson, it destroyed three and a half millions of people within a few years. Brought to Iceland in 1707, sixteen thousand fell victims—more than one fourth of the population. Reaching Greenland in 1733, it almost depopulated the country. Within the territory of the United States this disease has almost completely swept off whole tribes of Indians. Now an epidemic, or even a single case of smallpox, means neglect of the known means of prevention.

The present generation has witnessed the terrors and ravages of cholera in Europe and America for the first time, and already sanitarians have learned how to control it, and have held it at bay in southern Europe for six years. In those countries where hygienic laws are better understood, the disease has not been permitted to enter.

DURATION OF LIFE AT DIFFERENT PERIODS.

In the time of Cæsar, the average expectation of life was eighteen years; in the third century, the average duration of life among the most favored class at Rome was thirty years; now it is fifty years.

The records of Geneva give the expectation of life as follows: In the thirteenth century, it was 14 years; in the sixteenth century, it was 21.21 years; in the seventeenth, 25.67 years; in the eighteenth, 33.62 years. From 1801 to 1833, the average was 39.69 years; from 1814 to 1833, 40.68 years. In the sixteenth century, 25.92 per cent of children died in their first year; in the nineteenth century, 15.12 per cent. In the sixteenth century, 61.11 per cent, and in the nineteenth century 33 per cent, died before attaining 20 years. In the former period, 3.08 per cent passed 70 years; in the latter, 17.94 per cent.

In London, the annual death rate averaged at different periods, as follows: 1681–1690, 42.1 per 1,000; 1746–55, 35.5 per 1,000; 1846–55, 24.9 per 1,000. In 1871, it was 22.6 per 1,000, and in 1888, 19. In France, the expectation of life has increased from 28 to 45 years within the last half century. In Sweden, from 1770 to 1790, the average death rate was 28.5 annually per 1,000, and the expectancy of life about 35 years; from 1880 to 1885, the figures were respectively 17.5 and 57.

COMPARISON OF DISEASE AND MORTALITY UNDER VARIOUS CONDITIONS AT THE PRESENT TIME.

The researches of Caspar, at Berlin, into the vitality of different classes showed survivors as follows, in one thousand of each:

	Prosperous Class.	The Poor.
Alive after five years	943	655
Alive after ten years	938	598
Alive after twenty years	868	566
Alive after thirty years	798	486
Alive after forty years	695	396
Alive after fifty years	557	283
Alive after sixty years	398	172
Alive after seventy years	235	65
Alive after eighty years	57	9

The average length of life of the former class was fifty years; of the latter, thirty-two years.

The subjoined table is copied from a recent abridgment of a sanitary work by Sir Edwin Chadwick, and includes the families of each class. It has reference to London in 1843, when the general death rate was twenty-four per one thousand:

	Gentry and Professional.	Tradesmen and Shopkeepers.	Artisans and Laborers.
Proportions, per cent, of deaths from epidemics to total deaths	6.5	20.6	22.2
Proportions of deaths of children under one year to births	1 to 10	1 to 6	1 to 4
Proportions, per cent, of deaths of children under ten years to total deaths	24.7	52.4	54.5
Mean age at death of all who have died	44 years.	23 years.	22 years.
Mean age at death of all who lived more than twenty-one years	61 years.	50 years.	49 years.

The immense advantage enjoyed by the first class is explained by better housing and purer air and water, rather than by superior medical attention when sick. The second class can employ competent physicians, but lack means and intelligence to secure ample and hygienic housing.

A more striking illustration is furnished by the same author, of systematic marine sanitation, in the shipment of emigrants to Australia. In the first voyages, from ignorance of sanitation, from overcrowding, from filth and bad ventilation, as many as a third of the passengers died and were buried at sea. Afterwards the contract with the shippers was changed, so that they were paid, not on the number of passengers embarked, but on those landed alive. The shippers then engaged officers of health, who were paid according to the proportion of those landed alive. The result was a lowering of the death rate to one half what it had been among the same classes of people when living ashore. It is a suitable problem for legislators to devise some plan whereby similar results might be obtained in the population at large.

The following table, constructed from the researches of Sir Edwin Chadwick, illustrates alike rural and urban residence, and various conditions of life. Though it was made about fifty years ago, the ratio between different classes and localities is now substantially the same:

AVERAGE AGE AT DEATH.

	Gentry and Professional	Tradesmen and Farmers.	Artisans and Laborers.
Truro	40	33	28
Derby	49	38	21
Rutlandshire	52	41	38
Wiltshire	50	48	33
Leeds	45	27	19
Manchester	38	20	17
Liverpool	35	22	15
Bath	55	37	25

In Paris it has been found that one thousand persons in easy circumstances, between forty and fifty years of age, have an annual death rate of 8.3, while the same number of poor people have 18.7. In London there are some districts, inhabited by the wealthy classes, where the death rate is 11.3, against 38 in the slums. In Liverpool, among the upper class, 8 per cent died in the first year of life, against 19 per cent of the general population. The deaths from pulmonary consumption are nearly one fourth the entire number from all causes among the poor, against one eighteenth among the rich.

Of course, it is unfair to credit all this advantage in favor of those in easy circumstances to superior sanitary conditions, inasmuch as the same class enjoy a considerable advantage in medical attention when sick; but it must be admitted that those who are well fed, well clad, and well housed, are far less liable to contract disease than those exposed to constant hardships and deprivations.

While the death rate in the British Isles is three less per one thousand than in France, six less than in Germany, eight less than in Italy, and eleven less than in Austria, it is noteworthy that the agricultural production of Britain is about double what it is in those other countries. Sanitation, therefore, is associated with the other economic forces which build up national prosperity.

The disastrous effect of overcrowding in the habitations of the poor in large cities is illustrated by the mortality especially falling upon the earliest period. Of children under five years of age the death rate in New York has been one hundred and ten per one thousand, and the same in Chicago; in Cincinnati and Cleveland, fifty; in Boston, forty-six; San Francisco, about forty-five; New Orleans, about forty-four.

In the Southern States of the Union the death rate of the African race is nearly 50 per cent higher than that of white people. In New Orleans, where the comparative condition of the two races approximates as closely as anywhere, the relative mortality is given as follows:

YEAR.	Race.	Mortality Per 1,000.
1886	White	23.59
1886	Colored	34.09
1887	White	22.36
1887	Colored	32.12
1888	White	22.90
1888	Colored	32.04
1889	White	21.27
1889	Colored	30.93

The city of Calcutta is a forcible example of what may be achieved by intelligent sanitation. Its site is in latitude $22^{\circ} 35'$, upon the east bank of the Hoogly, and was formerly a swamp reeking with miasm. By drainage, an ample supply of stored rain-water, and other hygienic measures, its death rate has been reduced to twenty-six per one thousand, as in 1888, though cholera is almost constantly present. In contrast we observe St. Petersburg, founded about the same time (1703), in latitude $59^{\circ} 56'$, and likewise planted in a marsh. It has the advantages of much higher latitude, and absence of cholera, but neglect of sanitation gives it an annual death rate of thirty-two per one thousand in 1882, while Madras, Alexandria, and Cairo, with more favorable sites than Calcutta, in a sanitary sense, gave respectively forty, thirty-eight, and fifty-one per one thousand.

A more striking contrast is afforded by the two cities, El Paso and Juarez (Paso del Norte), on opposite sides of the Rio Grande, and communicating by a tramway across the river. The population of El Paso consists of eight thousand and thirteen whites, six hundred and eighty negroes, and two thousand one hundred and fifteen Mexicans. Juarez has about the same population, nearly all Mexicans. In the period between October 1, 1889, and May 27, 1890, the total mortality of the former was ninety, including six from smallpox; that of the latter was two hundred and fourteen, including forty-eight from smallpox. Estimated rate of mortality annually for the former, 12.27 per one thousand; for the latter, 29.18. The total number of cases of smallpox during this time at El Paso was twenty-nine; all sent to the pesthouse, except a very few who paid watchmen for guarding their houses night and day. The number of cases of smallpox at Juarez is not known. El Paso has strict sanitary regulations, and for Health Officer Dr. W. M. Yandell, who does not practice curative medicine at all, but gives his whole time to sanitation. The city has the Waring separate-sewer system for nine tenths of the population, and householders are required to make connection with the sewers. They are flushed daily by the Field tank, and ventilated by four-inch pipes running to the top of buildings. The outfall is into the river below the city. The water supply is taken from the river about a mile above. Juarez has no waterworks, nor system of sewerage. There is a City Physician, and nominally vaccination is a pre-requisite for admission to the public schools; but I was informed that it was not enforced.

Elsewhere in this volume will be found an account of epidemic smallpox at Las Cruces and Mesilla, New Mexico, during the summer of 1890, and public funerals of the victims from the church. No record of their number; no rivalry there between the Virgin Mary and Hygeia; not even "An Altar to the Unknown God."

DISEASES CONTROLLED OR CONTROLLABLE BY SANITATION.

The following diseases, which once prevailed extensively throughout Asia, Europe, and America, may be considered as practically controlled. The plague and sweating sickness have entirely disappeared, except the former from limited portions of Asia. Typhus fever and scurvy have so nearly disappeared that their presence is evidence of culpable negligence. Isolation of lepers has nearly eradicated leprosy from Europe and America, but it lingers or reappears in localities where this simple

method of control is neglected. Where vaccination is made compulsory, and strictly enforced, smallpox is scarcely known, as in Germany, England and Scandinavia. Its prominence as a disease is directly in ratio with neglect of this protective measure. Erysipelas, typhoid and puerperal fevers, are rapidly yielding to the judicious use of disinfectants; cholera is excluded by quarantine, or its infection destroyed by heat and chemical agents; croup and diphtheria have been much diminished by isolation and destruction of their contagious products; cerebro-spinal meningitis and scarlatina, by isolation. The malarial fevers gradually diminish as drainage of the soil improves. The same measure has ameliorated tuberculosis, and disinfection of sputa promises much more. Like dealing with the dejections gives good results in intestinal fluxes. Cleanliness and disinfectants have greatly mitigated the severity of venereal complaints. In short, the whole brood of zymotic ailments are fast coming under the sway of preventive medicine.

WHAT IS PROPOSED, AND WHAT IS DONE, IN OTHER STATES.

The following is quoted from a lecture by Dr. C. A. Lindsley, Secretary of the Connecticut Board of Health:

The causes of, and the means of preventing, infectious diseases are as well known and as readily controlled as those of railroad dangers. * * * Railroad corporations are compelled to pay damages in good money to their unfortunate passengers for injuries received on their roads; and, for loss of life, a few thousand dollars to surviving relatives. * * * Whenever our State Legislatures get so far enlightened as to make communities responsible for the suffering of their fellow-citizens by infectious diseases, and compel payment to every sufferer from the public treasury, then public hygiene will receive the attention which its importance demands. * * * No act of the Legislature could so promptly and so surely put Connecticut in the fore front of all the States of the Union for its superior sanitary condition as the enactment of a law like the following: "Every legal resident in every town in Connecticut, who shall, while residing in the town, have either of the following diseases, to wit: yellow fever, cholera, smallpox, typhus fever, scarlet fever, or typhoid fever, shall be entitled to receive from the treasury of the town \$3 for each day that he is confined to his house by such sickness, or by order of the Board of Health of the town for the public safety. And, in the case of the death of such person from such diseases, \$25 shall be paid from the town treasury to defray the expenses of the funeral. Every person so afflicted shall be subject to such regulations and restrictions during his sickness as the Board of Health of the town shall determine to be necessary for the safety of other persons."

There is better reason for paying such victims of disease than there is for paying damages to people who slip on icy sidewalks and hurt themselves. The town treasuries would suffer for a time, but soon town Boards of Health would become an important department of town government. The members of such Boards would be more considerably appointed than at present. Sanitary engineering, in the way of sewers, aqueducts, drainage schemes, etc., would be going on all over the State, to save the expense of paying for so much sickness.

Dr. Lindsley's ideal sanitation is not likely to be realized in the nineteenth century, but the early part of the twentieth may witness its inauguration; meanwhile, we may rejoice in the progress made in Michigan, as testified by Prof. A. L. Clark, of the State University, in a recent address before a Sanitary Convention at Norristown, Pa. He remarks that fourteen States have the township health-system. In Michigan, the Common Council of every city and village and the Board of Supervisors of every township is made by law a Board of Health, and is required to have constantly a well-qualified physician as Health Officer, and to report his name to the State Board of Health. In 1889, nine tenths of the one thousand five hundred localities complied with the law. Now mark the result: In 1888, the average number of cases and deaths in each separate outbreak of diphtheria in Michigan was,

respectively, 15.50 and 2.38, where isolation and disinfection were neglected (*i. e.*, without sanitary protection); and 1.74 and .58, where both were practiced (by sanitary authority).

HUMANITY VERSUS PROPERTY.

It will be instructive to compare the regard which the authorities of San Francisco give to human life and to the buildings of the city, as proved by the relative amounts expended in the matter of protection. The losses by fire in the year 1888 were \$870,219. The amount appropriated for the Fire Department for the fiscal year 1888-9 was \$336,710 54, which is nearly 39 per cent of the value of property destroyed by fire.*

Allowing the annual loss of California from preventable diseases to be \$3,000,000, as before calculated, and the city's portion of the same to be one fourth, we find a loss of \$750,000, for which the city expends less than \$30,000 in prevention, or 4 per cent. The authorities, therefore, are about ten times as liberal in the protection of property as in the protection of life. But the authorities are not solely responsible for a preference which has always existed. They were chosen by and of the people, and represent the people's ideas on most subjects, including sanitation.

According to the American Almanac, the fire losses of the United States for 1881 were \$80,522,900, or about two thirds of the estimated loss from preventable diseases at that time; and the fire losses of California were then \$3,045,600, or about the same as the cost of preventable diseases. The newspaper press gives all the details of one set of disasters, and is almost silent touching the other.

WHAT CALIFORNIA NEEDS.

The great want is a higher appreciation of preventive medicine, and its pursuit by a larger number of physicians. The difficulty is, that want of appreciation of its importance by the general public gives opportunity to scarcely any for devoting all their time and energies to this special branch. No one whose living depends on the practice of curative medicine can safely withdraw from it and take the precarious tenure of public sanitary service, and so far there is no private field for preventive medicine. There are approximately two thousand five hundred medical practitioners in California, who earn annually, on an average, at least \$1,000 each, from the practice of preventive medicine, or \$2,500,000. Now, it has passed into an undisputed proverb, that an ounce of prevention is worth a pound of cure. If there be any truth in the saying, would it not be wise to expend on it one sixteenth, or some similar fraction, of California's loss through sanitary deficiencies? One sixteenth of \$3,000,000 is \$187,500. But what is the amount actually allowed throughout the State for prevention? The State Board of Health is limited by the Political Code to \$4,000, and the Legislature in 1887 appropriated \$10,000 to aid the Board in excluding contagious diseases from the State, most

* At present writing (July, 1890), there is a probability that private citizens will contribute a further sum of \$100,000 for the purchase of chemical apparatus and hose, on the ground that the Fire Department is deficient in these important appliances. But the newspapers say nothing of the deficiencies of the Health Department for preventing disease, though the wants of the City and County Hospital are prominently set forth.

of which is still unexpended. Its average expenditures therefore do not exceed \$5,000.

In San Francisco the ordinary expenditures of the Health Department for strictly sanitary purposes fall short of \$30,000 annually; in Los Angeles they are rather less than \$5,000; in Sacramento and Oakland we may suppose the same amount to be expended, in the absence of available figures. For the State the whole amount is probably less than \$60,000 annually, or about 5 cents *per capita* for the entire population, and less than one third of the estimated "ounce of prevention."

Sanitation is the youngest and least loved of the children of Medicine. Many are not yet convinced that the infant is worth raising to maturity, and would let it starve rather than have any expense with it. Monterey has a newly born Health Department, its viability conditioned on service of its Health Officer for the nominal salary of one dollar a month! This is one dollar better than the allowance to the Health Officer at Las Cruces, New Mexico, now in a helpless struggle with smallpox. But Monterey has made a beginning, and may, later on, allow that "the laborer is worthy of his hire." This is of equal force with the declaration, "To the poor the gospel is preached;" but observation proves that poor pay and poor preaching go together. The same must hold in sanitation. It costs study, and labor, and material, and its value is likely to have direct relation to cost, according to the general rule of supply and demand. What it has contributed to the general welfare, and what is still to be expected, has been here imperfectly shown. I do not apprehend that any one begrudges the cost so far, or denies that public wealth has gained in like measure with public health.

Let us now come to the conclusion of the matter: Shall the good work go onward, or backward? Is California content to be outstripped in any branch of public improvement by less wealthy communities, or rest with a public health service inferior in any respect to what exists in the oldest and most enlightened polities of the globe? Let the people and their chosen representatives answer by their acts.

DISPOSAL OF SEWAGE.

Written for the State Board of Health of California by RUDOLPH HERING, Civil and Sanitary Engineer of New York.

A complete system of sewerage should collect the foul waters from an inhabited territory and dispose of them in a satisfactory manner. The collection is accomplished by means of a certain arrangement or combination of pipes or sewers, and the disposal by means of some treatment leading to the purification of the water which has acted as a carrier for the matter removed during cleansing operations from the person, his clothing, and his habitation.

Most of the organic waste matter thus taken up by the water is so finely comminuted, if it is not actually in solution, or itself a liquid, that it is at once seized upon by swarms of bacteria, and finally decomposed into inert matter which is inoffensive or harmless to us. In serving as food for bacteria, however, it increases their prevalence in our midst. This fact would be beneficial if all of them confined their task to the annihilation of sewage. But there are certain bacteria which, if permitted, will also seize upon the living blood and tissues of higher organisms, producing cases of zymotic disease, a certain percentage of which terminate fatally.

It is therefore necessary for the health of the community to prevent decomposition of organic matter as much as possible, under circumstances which contribute to the spread of bacteria in our midst. For this reason the sewerage system should be designed, constructed, and operated so that the waste matter, from the time that it enters the pipes within the dwellings, should be carried swiftly, and with a minimum of opportunities for retention or deposit on the way, until it reaches a point where it can safely be purified. The engineering problem, so far as it concerns the sanitary features of the system, is thus determined.

The design should aim to cause the water to flow with a sufficient velocity, so that the heaviest of the ordinary matter will be carried in suspension to the point of disposal, and thus prevent deposit and consequent foulness within the sewer. There is a fixed relation between the velocity of the fluid and the matter which it will carry in suspension. Thus, sand will be carried along by a stream of water flowing with a speed of six inches per second, but be deposited if the velocity is less. Pebbles one inch in diameter are carried along by a flow of about two feet per second, and are deposited if the velocity becomes less. The sewers should, therefore, have a certain minimum inclination or fall. They should also have a sectional form which will concentrate the sewage laterally into a compact stream, instead of allowing it to be spread out in a thin sheet. All changes in the direction of the flow should be made in such a manner as to prevent eddies, or a material reduction of the velocity. The interior surface of the sewer upon which the sewage flows should be as smooth as it is practicable to make it, because roughness causes particles to be held back. It would likewise be desirable,

but engineering science has not yet solved the problem, to prevent a smooth surface from allowing the adhesion of mycelial and other growths, forming a slimy surface, and thereby again causing the adhesion of passing matter.

In spite of the greatest care in building and in maintenance, some decomposition will always occur in sewers, and we must, therefore, provide for cleansing, both by ventilation, to dilute and remove offensive gases, and by flushing, to produce an increase of the ordinary amount of velocity of the water, and thereby cause it to again take up and remove matter which has been deposited. Ventilation is usually obtained by facilitating the natural circulation of the air within the sewers. This circulation is caused by a difference of temperature and of humidity within and without the sewers, and under certain conditions by impulsion, due to the flow of the water. Artificial ventilation has rarely been a success, owing to the necessary complication in the arrangement of the pipes within the houses and in the streets. Flushing is usually obtained by causing the sewer to run more than half full for a short period of time, either by temporarily damming the sewage, or by suddenly introducing other water in large quantities.

This first part of the problem, namely, the collection of sewage, is comparatively simple, but the second part, pertaining to the final treatment with reference to purification, is far less so. It has been the subject of much controversy and of many experiments. Until recently, when bacteriology had sufficiently developed to throw some light upon the matter, the discussions were generally unscientific, based upon assumptions rather than facts, and often guided by self-interest, with consequent misrepresentations of facts.

For a long time the principal efforts were directed toward converting sewage into manure. It was thought that, besides being a satisfactory solution of the sewage question, great profits could be made from such a conversion. In Europe "dry removal" of the nightsoil or solid matters was frequently urged. This allowed manure to be manufactured from sewage at a smaller cost than if the solid matter were combined with the wash water from kitchens, laundries, bed-rooms, etc. But this water was still left unprovided for, and formed sewage about as offensive as when it contained the more solid matter. A good example of this may be seen in Paris, where most of the excrementitious matter was, and, I think, still is, separately collected and disposed of as manure, but where the sewage in the sewers is so foul that the river Seine, below the outfalls, is made black in color and offensive to smell. England, which has generally been in the lead in sewerage matters, has only a few localities retaining the system of dry removal. But in every such case it still leaves unsolved the purification of the large amount of dirty waste water which is discharged from the buildings of a modern city well supplied with water, and which virtually makes up the sewage thereof.

The quantity of sewage which it is necessary to deal with is approximately measured by the quantity of pure water supplied to the inhabitants. Gaugings have shown that the two correspond closely. Sometimes the natural soil is very wet, and when drained into the sewers increases the quantity of sewage. Elsewhere the ground may be dry, the rainfall scanty, and much of the water supply used for sprinkling, which diminishes the quantity of sewage; but on an average the relation

is nearly constant, and furnishes a good measure for projected schemes of sewage purification.

In European cities the water consumption ranges from twenty to fifty United States gallons per day per head of population, and in American cities from fifty to one hundred and fifty gallons. The greater figures for our own country are due partly to a more liberal use of water and partly to the waste caused by a lack of restrictive measures. While we may in the future prevent much of this waste, we will hardly curtail, to any great extent, the amount of water supplied, as in a modern community the legitimate uses for it are continually increasing in number. In comparing the results of sewage purification in Europe with those of our own country, we must therefore not forget the relative quantities of sewage which have to be dealt with.

Probably the oldest method of disposing of the waste waters, though imperfect in detail, was the application to land, or simple irrigation. In Italy and Spain, and some parts of Germany and France, more or less crude methods were occasionally practiced. The object of irrigation was profit rather than sewage purification, and therefore the requirements for the latter were left substantially undeveloped.

Toward the middle of the present century, when cities began their modern rapid growth, the question of purification of sewage forced itself upon the communities. This was particularly the case in England, where many towns, using rivers as sources of water supply, also used them as the most convenient depositories for their waste water, to the detriment of the towns below.

Broad irrigation was recommended and applied with more or less success. The leading idea was to have vegetation absorb, and thus to dispose of the sewage as it was delivered upon the fields. One acre was considered necessary for the sewage from about one hundred to two hundred persons. But not everywhere was suitable or sufficient territory to be had, and seldom was this method of disposal found to pay the cost of properly applying the sewage to the land.

It was then suggested in England that in porous soil sewage could be purified by filtration, and would require much less territory, namely, one acre of land might serve for from six hundred to one thousand persons, according to the porosity of the soil. This method was found to be successful in purifying sewage when the ground was carefully prepared in level beds and furrows, and underdrained, and when the application was intermittent.

Where no porous ground was obtainable, or where its preparation was too costly, filtration was not feasible, and still other methods of purification had to be sought. It was known that milk of lime, salts of iron, and other chemical agents, would coagulate some of the albuminous compounds, precipitate organic matter, and thus clarify the liquid. The deposited "sludge" could then be treated as manure. A multitude of processes for precipitation were patented, and some were practically tried. The general results in brief were these: The clarified liquid was still more or less impure, and soon putrefied if left standing. If discharged into a river, however, and diluted with fresh water the discharge was not objectionable. The deposited matter, or "sludge," was, however, rarely of sufficient value as a manure to justify the expense of drying and preparing it for the market. Owing to the cost of the

chemicals and of handling the sewage, the cost of precipitation was often prohibitory.

In the meantime, those cities which were situated upon large rivers or on the coast, disregarded all methods of land and chemical treatment, and turned the crude sewage directly into the passing currents of water, generally because it obviated the cost of providing special works for purification.

Each of the three above mentioned methods of sewage disposal began to have its advocates, and we can find a voluminous literature setting forth the advantages peculiar to each. An impartial observer examining the various executed works for sewage disposal would come to about the following conclusions:

Each one of the above methods has merits, and is capable of accomplishing the desired object under favorable conditions. A preference of one over the other should rest upon the desired degree of purity and upon the relative cost. Where a direct discharge into a large river or into the sea is not objectionable, it will generally be the least expensive method of disposal. Where such a discharge is impracticable, either a partial or a complete purification can be obtained by straining the sewage through screens, which will prevent floating matter from stranding upon the shores or in shallow places. A much better partial purification is obtained by collecting the sewage in tanks and treating it with precipitants. The effluent water in this case can be made clear and discharged into a stream or along the ocean beach with impunity. Where the stream is to be thereafter used for a water supply the effluent from precipitation works is usually unsatisfactory, unless it can afterwards be subjected to land filtration.

Filtration through land unquestionably accomplishes a greater degree of purification than can be obtained by any other method of treatment. If the conditions are favorable, the soil suitable, and the management good, the purification can be made complete, and the effluent safely be discharged into any stream furnishing potable water.

While existing sewage works, if carefully compared, lead the observer towards these conclusions, we are now, through our recently acquired knowledge of the bacterial action upon sewage, also able to explain them, at least partially.

A jar of fresh sewage if left standing in a warm room soon becomes putrid. The number of bacteria increases until a maximum is reached, after which the water assumes a clear color, and a sediment forms on the bottom. After a sufficient time the main body of water is practically free from putrescible organic matter and bacteria, and contains in solution but the gases, which are the products of decomposition. This purification is hastened by warmth and aeration, and it is retarded or prevented by cold and lack of oxygen—conditions which are respectively favorable and unfavorable to the development of germ life.

If sewage is sterilized by boiling or otherwise, and retained in this condition, no purification takes place. It is therefore necessary, first, to provide conditions which are favorable to the life and action of bacteria upon the sewage; and, secondly, to prevent the resulting decomposition from being offensive, through an absorption of the gases, either by large bodies of water or by the soil. With these requirements as a basis we can arrive at some practical results.

The discharge of sewage into large bodies of water will not be objec-

tionable if the dilution is great enough to supply the required oxygen, and to absorb all the gases of decomposition. When the temperature of the water is high, bacterial action is more rapid and the dilution required greater than when the water is cold. This fact is demonstrated by comparing the condition of streams or lakes receiving sewage in southern with those in northern latitudes. A warm current will, therefore, show a complete purification to have taken place earlier along its course than a cold one in which bacterial action is retarded; instance the summer and winter conditions of the canal and the Desplaines River, which receive the sewage of Chicago, and where the polluted condition can be traced much farther down stream in winter than in summer.

Further, as salt water is not favorable to the life of bacteria, purification is slower, and sewage remains therein in a decomposing condition for a longer time than if the water is fresh. Coves and bays receiving sewage are, therefore, apt to become foul sooner in salt than in fresh water. Therefore, again, if a constant current could be obtained to dilute the sewage and to carry it away, less water would no doubt accomplish the object satisfactorily in salt than in fresh water. Unfortunately, we have very few precise measurements referring to this matter, and even if we had many, the conditions are generally so different that they seldom permit a direct comparison. We must depend upon results derived from experiments on a small scale and from general comparisons, and for the present be content to draw our fundamental conclusions only from relative instead of absolute data.

Sufficient experience has been gained, however, concerning the latter, to obtain some approximate figures for the amount of sewage dilution required to prevent objectionable conditions. In a paper read before the American Public Health Association (Vol. XIII of Trans.) I have collected some fragmentary data on the subject, reduced them to a common measure, and indicated the inferences to be drawn. It is there said:

The first point to settle is a proper measure for the permissible pollution. This is best assumed as being the quantity of water which can safely receive the drainage from a unit of population; in other words, the least number of cubic feet of water per minute which should flow down the stream for say one thousand persons draining into the same. By using this measure we eliminate the difficulties arising from a varying quantity of water consumption and dilution of sewage before reaching the stream.

The problem then is, how much running water must we have to dilute the sewage from every one thousand persons in order to make it inoffensive, not objectionable to manufacturing interests, nor destructive to fish?

The standard for inoffensiveness must of necessity be one of personal judgment, and can only be approximate. The admissible sewage pollution of water used for manufacturing purposes depends on the particular industry, some mills require a much higher standard than others; and, unless in any particular case the nature of the industry is a governing element, we are again obliged to resort to personal judgment as to what is a fairly clean water for average cases. A standard of pollution which, thirdly, will prevent the destruction of fish depends upon the particular species which it is desired to retain. Yet, as we find fish living in sewage-polluted water which is sufficiently diluted to answer the first and second requirements, we can usually ignore this one, except in occasional instances, where it assumes special importance, and where special experiments will become necessary.

After stating the manner in which practical results could be obtained from existing information and describing the instances in America and Europe where approximate measurements had been made, it is said:

By comparing those results, and also those of the other rivers mentioned, we can observe much similarity and consistency, and, for the present, we may draw the following inference: Rivers not to be used for water supplies, but to be inoffensive to communities residing a few miles below, to remain fit for ordinary manufacturing purposes, and to sustain the life of fish, may receive the sewage from one thousand persons for at least one hundred and fifty to two hundred cubic feet of minimum flow per minute, supposing that natural

subsidence of the heavier matter takes place immediately below the town discharging the sewage.

Beyond the above limit it appears to be advisable, when arranging for a sewage disposal, to resort to its purification at once by land or other filtration, or by chemical precipitation, in order to prevent the river water from becoming objectionable to others.

While the above figures may be a useful guide in many instances, yet they are but empirical formulæ, to be used only by those who thoroughly understand the subject, and to be applied only in cases similar to those from which they were deduced.

We are more fortunate in the way of exact data regarding the purification of sewage by land filtration. The Massachusetts State Board of Health has, for several years, been engaged in experimenting on this subject at Lawrence, Mass., where a station has been erected for the purpose. In the nineteenth annual report (1888) it is said, in regard to areas that may be selected for filtration, that, at present, no one can tell the character of the effluent water that will result from the application of sewage in large or small quantities, nor the effect of our winters and of long storms upon the efficiency of the soil, nor the proper intervals for application. This knowledge could only be obtained by trial and careful observation. An appropriation was therefore secured and the necessary experiments made. They at present still continue and results are being reached, which, for the first time, place the entire subject of sewage filtration upon a scientific basis.

The filtering grounds comprise about two thirds of an acre. Upon them are ten tanks, circular in plan, about seventeen feet in diameter, and allowing for material to be filled in five feet deep. From the lowest point in the bottom of each tank a two-inch pipe conveys the drainage to a flume within a building, whence the effluent is taken for analysis and examination.

The tanks were filled with different materials, as follows: No. 1, very coarse, clean mortar sand; No. 2, very fine, nearly white sand; No. 3, peat; No. 4, river silt; No. 5, brown garden soil, well manured; Nos. 6, 7, and 8 were filled with three feet eight inches of coarse and fine sand, ten inches of yellow sandy loam, and six inches of brown soil; No. 9, very compact, sandy, hardpan of clay, sand, and gravel, covered with nine inches of brown soil. No. 10 was used to measure the rainfall and evaporation. The sewage used in the experiments was taken from a main sewer draining a portion of the city. Apparatus were erected for measuring the sewage and the effluent, and biological and chemical analyses of both were made daily. The sewage was applied intermittently at intervals of one or more days, and disappeared from the surface in a few minutes or hours.

From the last report of the Board we gather the following statements regarding the general results which were so far obtained:

Sewage can be much more efficiently filtered through open sand than through sand covered with soil. Very fine material, like dust, in the upper layers of a filter, prevents free access of air, and when wet, may exclude air so completely as to render purification impossible. With soil or sand containing dust at the surface, periods of intermission in the application of sewage may be made so long that the surface, becoming dry, may allow air to enter, and a high degree of purification may result; but the quantity of sewage that can thus be purified is very much less than when the upper layers of the filter are composed of open sand, through which the sewage will rapidly disappear, and will leave room for air to enter and come in contact with the thin laminae of liquid covering the particles of sand.

Filtering areas of sand covered with soil, or areas of very fine sand, may be much increased in efficiency, in both summer and winter, by digging trenches in the direction of a slight incline, about two feet deep, and one foot wide, and six feet apart, and filling them with coarse sand. The sewage should be applied to this coarse sand, and once in a month or two, a half inch in depth should be taken from its surface and replaced by clean sand.

A very few vegetable organisms that can be identified by the microscope have been found to occasionally pass through the coarser filters; but in general none come through.

Of the still more minute organisms, the bacteria, we found that soon after sewage was first applied to the tanks they came through in great numbers, but became reduced in number, and during the later winter and spring months amounted to 2 per cent and less of those of the applied sewage; but after nitrification commenced they decreased rapidly, and continued through the summer, in many cases, less than one hundred; and, in some, less than ten, while the number in the same quantity of applied sewage was about a million.

The experiments made to the present time show that the number of bacteria in the sand decrease very rapidly from the surface downward. In the finer sands they nearly or quite disappear before the bottom is reached. Experiments are in progress to prove whether any live to come through the finer sands with the effluent; but they have already shown that through the very coarse sands they are brought with the effluent in very small numbers, with the ordinary rate of flow from the sewage tanks, and that when the rapidity of flow is the highest, the number of bacteria in the effluent has reached as high as 2 per cent of the number in the applied sewage.

In some of the tanks it appears, that of the large number of species found in the sewage, a single species only lives to reach the outlet.

We have reason to hope that the filters may be so made and managed that all disease germs may be, with certainty, removed, and think this important subject should be pursued to definite conclusions.

The tanks, which were filled with clean, coarse mortar sand, received sewage at the rate of thirty thousand, sixty thousand, and one hundred and twenty thousand gallons per day. Until nitrification commenced—after periods of forty-one, thirty-one, and twenty-seven days, respectively—97, 94, and 80 per cent of the impurities of the sewage were removed. When nitrification reached its height, the ammonias were reduced to 1 and 1½ per cent of those of the sewage.

The rapidity of purification, as shown by the decrease in ammonias, was greatest in the tanks which had received the most sewage, and had the greatest amount of nitrogenous matter stored in them, the effluent from the sand which had received the least sewage being more than a month later in reaching its condition of greatest purification.

The filter receiving sewage at the rate of one hundred and twenty thousand gallons per acre per day gave an effluent for three months after purification, resulting from nitrification, was established, in which the ammonias were less than 1½ per cent of those of the sewage. Upon increasing the amount filtered to one hundred and eighty thousand gallons per acre per day, the ammonias increased, but for the next four months averaged less than 2 per cent of those of the sewage.

The filter receiving sewage at the rate of sixty thousand gallons per acre per day for seven months after purification was established, gave an effluent of nearly constant quality, having one half of 1 per cent of the ammonias of the sewage, the free ammonia averaging 0.0012 parts, and the albuminoid ammonia 0.0015 parts in one hundred thousand parts, showing less organic matter than many of the drinking waters of the State.

Experiments were made to ascertain the different effects of continuous and intermittent filtration. "In intermittent filtration the nitrification was active, and, as shown by the ammonias, 99 per cent of the organic impurities were removed; while in continuous filtration the nitrification ceased, and the same sand, filtering the same quantity of sewage, stored impurities for a time, but poured out an effluent quite as impure as the applied sewage."

Fine sand was found to make the best filter, and could purify the sewage to a higher degree at the rate of twelve thousand gallons per acre per day, so that the number of bacteria in a cubic centimeter was reduced from five hundred and ninety-one thousand to two, and the ammonias to one fourth per cent of that of the sewage.

Garden soil was found to make a very poor filter or purifier. After applying only ten thousand gallons per acre per day for eight months, the effluent was "more impure than the applied sewage." The bacteria numbered one hundred and nine, while in the sewage they numbered two hundred thousand.

A mixture of coarse and fine sand and gravel filtered sewage very satisfactorily at the rate of twenty-five thousand gallons per day in the winter, and forty-two thousand gallons per day in the summer. The bacteria of the effluent numbered fourteen, while those of the sewage numbered three hundred and fifty thousand.

Peat was found to be entirely inefficient as a purifier, the ammonias in the effluent being equal to those in the sewage.

The filter containing loam and sand gave an effluent very nearly as pure as that from the sand and gravel alone, but the quantity of sewage which could be filtered was only one third as great.

A report giving a very full description of the details of the investigation and further conclusions will soon be issued, and will form a most valuable contribution to the knowledge of the world upon the subject of sewage disposal. While much of the information applies to a climate which for several months is both damp and cold, many of the results will be equally valuable for the climate of California.

The land disposal of sewage is a question which will be of peculiar interest to the citizens of your State, as irrigation during the dry season is of vital importance, and water at that time assumes a high value. Besides accomplishing a sanitary benefit, it may therefore also be made remunerative from a financial point, which cannot generally be said of such works in the Eastern States, and you may expect to find this method of sewage disposal a favorite one. However, to make sewage farms pay a profit should always be a secondary consideration, the sanitary question being held uppermost.

Regarding the often expressed fear that sewage farms create a nuisance and injure the value of neighboring property, I quote the following paragraphs from a report upon the disposal of the sewage of Los Angeles City, made in December, 1889:

Sewage farms need not cause any nuisance. Some smell may be noticeable at the ditches towards evening when the air is damp, and on muggy days. It may particularly be the case when the sewage is not delivered fresh.

There is no well authenticated case where sewage farms have caused sickness. In England, people reside on lands adjoining them. In Paris and Berlin new villages have sprung into existence since the sewage has been used for irrigation, and the death rate is recorded as being little over one half of that of the respective cities.

In order to have a minimum amount of odor, it is necessary to convey the sewage in open, artificial, and smooth channels or carriers, and allow it to run in earth ditches only for temporary purposes; and where it immediately filters away, these ditches should be frequently raked over to be kept clean and pure.

Those who have inspected the successful sewage farms in Europe and America can bear testimony to their freedom from nuisance, when proper care is taken with the distribution of sewage and the ditches. This care simply consists of faithful attention. It is neither irksome nor expensive, and is capable of being secured by appropriate legislation.

From what has been stated in these pages it can be seen that by means of the advances of bacteriology the question of sewage disposal has emerged from the realm of doubt, and by assuming a position which allows an intelligent and rational perception of some of the main requirements necessary for its solution, has become a science. Although much still remains to be accomplished, the engineers of to-day are in a better position than formerly to solve the question, and avoid the risk of failure.

NEW YORK, September, 1890.

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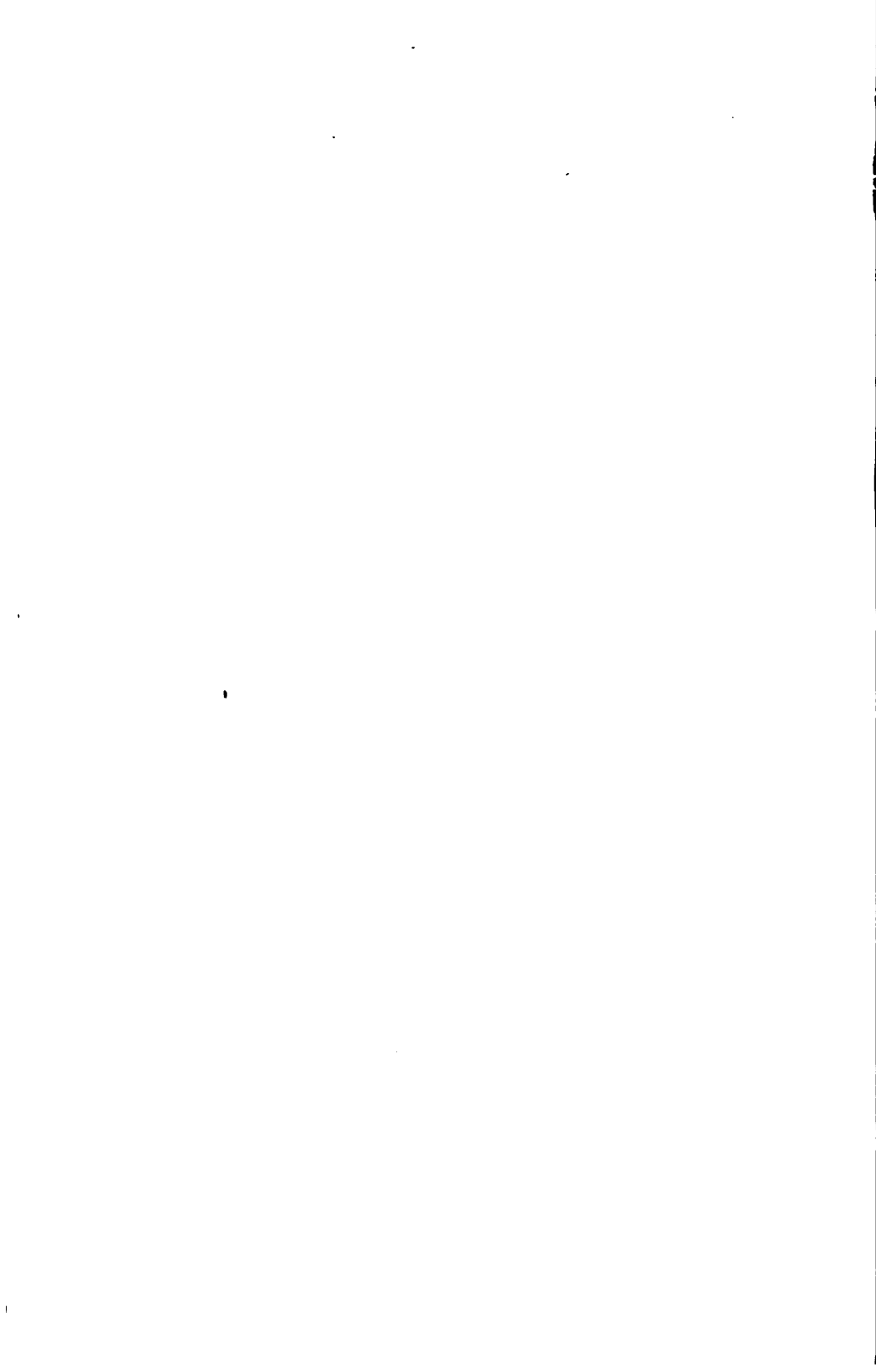
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C28 TWELFTH BIENNIAL REPORT

UNIV. OF MICH.

MAY 17 1909

OF THE

STATE BOARD OF HEALTH

OF

CALIFORNIA,

FOR THE FISCAL YEARS FROM JUNE 30, 1890, TO JUNE 30, 1892.



SACRAMENTO:

STATE OFFICE, : : : : A. J. JOHNSTON, SUPT. STATE PRINTING.
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1892.



OFFICE CALIFORNIA STATE BOARD OF HEALTH, }
SACRAMENTO, September 15, 1892. }

To his Excellency H. H. MARKHAM, Governor of California:

SIR: I have the honor to present to you, in compliance with the laws of the State, the twelfth Biennial Report of the State Board of Health, for the fiscal years from June 30, 1890, to June 30, 1892.

Very respectfully,

J. R. LAINE, M.D.,
Secretary State Board of Health.

MEMBERS OF THE CALIFORNIA STATE BOARD OF HEALTH.

TO APRIL 20, 1891.

President.

HENRY S. ORME, M.D. Los Angeles.

Secretary.

GERRARD G. TYRRELL, M.D. Sacramento.

W. R. CLUNESS, M.D. Sacramento.

R. BEVERLY COLE, M.D. San Francisco.

JAMES SIMPSON, M.D. San Francisco.

J. M. BRICELAND, M.D. Shasta.

C. A. RUGGLES, M.D. Stockton.

PRESENT MEMBERS OF THE STATE BOARD OF HEALTH.

W. G. COCHRAN, M.D. Los Angeles.

J. R. LAINE, M.D. Sacramento.

W. R. CLUNESS, M.D. Sacramento.

C. W. NUTTING, M.D. Etna.

C. A. RUGGLES, M.D. Stockton.

P. C. REMONDINO, M.D. San Diego.

• OFFICERS OF THE BOARD.

W. G. COCHRAN, M.D. President.

J. R. LAINE, M.D. Secretary.

GENERAL REPORT OF THE BOARD.

To his Excellency H. H. MARKHAM, Governor of California:

SIR: Agreeable to an Act establishing a State Board of Health, and defining its powers, the twelfth Biennial Report of the State Board of Health is hereby submitted.

The purpose and ultimate object of establishing the California State Board of Health is the conservation and improvement of the public health. All the functions with which the Board may be endowed are specifically designed for the promotion and accomplishment of this end.

The law specifies that the Board must place themselves in communication with the local Boards of Health, hospitals, asylums, and public institutions throughout the State, and take cognizance of the interests of health and life among the citizens generally. They must make sanitary investigations and inquiries respecting the causes of disease, especially of epidemics, the source of mortality and the effects of localities, employments, conditions, and circumstances on the public health, and gather such information in respect to these matters as they may deem proper for diffusion among the people. They may devise some scheme whereby medical and vital statistics of sanitary value can be obtained, and act as an advisory Board to the State in all hygienic and medical matters, especially such as relate to the location, construction, sewerage, and administration of prisons, hospitals, asylums, and other public institutions. They must, at each biennial session of the Legislature, make a report, with such suggestions as to legislative action as they deem proper. It is also made the duty of the Board to examine into and report on the effect and use of intoxicating liquors upon the industry, prosperity, happiness, health, and lives of the citizens of the State, and what legislation, if any, is needed in the premises.

These specified duties are general in character, and make the functions of the Board purely advisory, with no mandatory authority over any condition or influence, however dangerous, which may threaten the health and life of the people of the State. In regard to the functions and duties of the Board, so far as they relate to any of the influences which affect public health, they are wholly performed when the Board suggests or advises what ought to be done. In other respects its function is that of a public educator, in teaching the precepts of health and the fundamental laws of public hygiene. This includes assistance and persuasion in organizing local Boards and calling attention to their duties and responsibilities, and indicating the direction which will make their efforts effective.

The only branch of public hygiene which, in the exercise of official function, possesses executive power to execute and enforce sanitary laws, is the local Board of Health. To bring the State and local Boards into a closer relation, tending to a uniformity of general action in sanitary work, will be the aim of the State Board.

The monthly reports of deaths and diseases published by the State Board are obtained exclusively from the Secretaries of local Boards, Health Officers, and physicians, who perform this work gratuitously for the public good. The Board is wholly dependent upon such sources of information for its knowledge of the condition of the health of the State. In order to utilize the information so received it is the custom to issue a

monthly circular to all the local Boards of Health, and to such other citizens who may desire it, giving as accurate a statement of the condition of the public health during the previous month as can be made from the facts obtained. There has been an active interest and willing coöperation on the part of correspondents. It is the intention of the State Board to invite the local Boards and correspondents to meet in convention, to council as how best to increase the efficiency of the sanitary authorities of the State. As all real authority is vested in the local Boards, it is manifest that the greatest effectiveness will be reached by organization.

The remainder of the appropriation to exclude contagious diseases from the State amounted to \$5,982 45, July 1, 1890. Of this sum there remained unexpended on July 1, 1892, \$5,732 45. The maintenance of a Medical Inspector on the Oregon line during the epidemic of smallpox in British Columbia, in July and August, reduced the fund to about \$5,300.

ASIATIC CHOLERA.

In view of the rapid spread of Asiatic cholera in Europe, and the probability of its reaching the United States before the epidemic dies out, the advisability of making a generous appropriation for inspection and prevention purposes, at the State lines where railroads enter the State, is earnestly urged.

Should it become necessary to establish quarantine and refuge stations, there are four points that should be fully covered to make it effective. It would be necessary to place one on the Oregon line in the north; another near Truckee; another at The Needles, and another at Yuma. In addition to placing Inspectors at those points to inspect all trains, it would be necessary to provide for the establishment of hospitals of some character, either tents or temporary board shelters, with the necessary supplies of bedding, food, and medicine, to care for the sick and well while detained. It is impossible, at this time, to estimate how much it will be necessary to do; but, if an attempt be made towards the establishment of anything like a rigid land quarantine, it will involve the expenditure of a large amount of money. In addition, it is necessary to take into account the number of people it will be necessary to employ in carrying out these measures. It will also be necessary for the State to quarantine the port of San Pedro. Inspectors will not only need to be paid, but people engaged in fumigating cars, baggage, and other effects, and those employed in nursing the sick in quarantine camps will doubtless exact larger salaries than they would receive in ordinary employment. We believe that these contingencies will justify a large appropriation to be made, under such restrictions as the Legislature may deem advisable. The Board, therefore, in view of the situation at this time (September 15th), recommends that an appropriation of \$50,000 be made for the prevention of contagious diseases.

Very respectfully,

W. G. COCHRAN, M.D., President.
J. R. LAINE, M.D., Secretary.
C. A. RUGGLES, M.D.
C. W. NUTTING, M.D.
W. R. CLUNESS, M.D.
P. C. REMONDINO, M.D.

ABSTRACT OF PROCEEDINGS OF THE BOARD.

AS SHOWN BY THE MINUTES.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, July 23, 1890.

Present—Dr. Orme, President; G. G. Tyrrell, Secretary; Dr. J. M. Briceland, Shasta; Dr. C. A. Ruggles, Stockton, and Dr. W. R. Cluness, Sacramento. Absent—Dr. Jas. Simpson and Dr. R. B. Cole, San Francisco.

The minutes of the last meeting were read and approved.

The Secretary reported that since the last meeting of the Board a communication had been received from the State Analyst, informing the Board that he was about leaving for Europe, and would be glad to represent it in the International Medical Congress to be held in Berlin, in August. As this was an opportunity for our Board to obtain, through Professor Rising, a report of the section on hygiene, I issued to him credentials as a delegate to the Congress from this Board, with a request that he report the proceedings.

On motion, the action of the Secretary was approved.

The Secretary reported that he had received a communication, accompanied by a long petition, from the citizens of Dunsmuir, requesting the Board to appoint a Health Officer for that town, the Supervisors refusing to do it, although it was claimed to contain five hundred inhabitants.

I wrote to the District Attorney, advising him of the request, and asking them to enforce the law. In reply I received the following:

YREKA, CAL., June 14, 1890.

G. G. TYRRELL, M.D., *Secretary State Board of Health*:

DEAR SIR: Your communication of date of June 9th has been received. I have looked into the facts and situation fully, and have concluded that it would be well to advise you of same before taking action. There never has been a petition presented to our Board of Supervisors for the appointment of a Health Officer for the town of Dunsmuir, by affidavit, or otherwise; that the town of Dunsmuir contains five hundred or more inhabitants. The Supervisor from that district stated that he was satisfied that the town did not contain the required five hundred inhabitants. The only written application ever made was by Mr. J. N. White. This was only a request for the appointment, and contained no showing whatever that the town was entitled to such appointment.

In the absence of official knowledge, which they cannot have in this case, the Board should have some satisfactory proof as to the number of inhabitants, before acting. The Board, no doubt, as soon as satisfactory proof is given that Dunsmuir is entitled to the appointment of a Health Officer, will make the appointment. Members of the Board tell me that the only reason for not making the appointment was the absence of proof that Dunsmuir is entitled to the appointment, and that when that is forthcoming they will promptly make the same. Please reply.

Yours very respectfully,

J. D. BEARD.

On receipt of the above, I at once forwarded the petition of the citizens to be presented to the Board of Supervisors, with a request that immediate action be taken, which elicited the following reply:

G. G. TYRRELL, M.D., *Secretary State Board of Health:*

DEAR SIR: Received your letter yesterday, and also the petition forwarded to your Board from Dunsmuir. At the next meeting of the Board of Supervisors, I think that this matter will be adjusted satisfactorily. The Board meets on first Monday in July.

Yours truly,

J. D. BEARD.

Since that date the Board of Supervisors have met, but made no appointment. On motion of Dr. Briceland, the Secretary was instructed to wait until the official report of census was made, and then if it was ascertained that Dunsmuir contained the number of inhabitants to entitle it to a Health Officer, to have one appointed, which was carried.

The Secretary reported that he had requested the City Attorney of Monterey to have a Board of Health organized and a Health Officer appointed for Monterey. In reply he promised to attend to the matter without delay. Action approved.

The Secretary introduced to the Board a Mr. Schoonmaker, from Lodi, who desired to exhibit for the approval of the Board an adjustable bathtub seat for the use of the sick. The invention consisted of a metal or iron standard fastened to the wall, upon which a slatted seat with adjustable rack was placed. Upon examination by the Board, it was of the opinion that under many conditions the invention was likely to prove useful, and had no hesitation in recommending its trial by hospital or private institutions.

The Secretary was authorized to convey the Board's opinion to Mr. Schoonmaker.

Dr. C. A. Ruggles, delegate to the National Conference of State Boards of Health, begged leave to report verbally his action. He stated, as preliminary, that on his way south he traveled with a Dr. Stevens, a practitioner in New Mexico, who informed him of the great prevalence of smallpox in El Paso and Deming and vicinity, so much so that merchants were leaving in affright.

Dr. Ruggles, deeming this information of the utmost importance to California, at once wrote to Dr. Tyrrell, advising him to take immediate steps to ascertain the extent of the epidemic, and to establish quarantine, with the consent of the Board, if necessary.

Upon arriving at Nashville he was, on making himself known, received most cordially by the delegates at the conference. The principal discussion of the conference was upon the necessity of teaching the public the value of sanitation, and it was considered that this object was better attained by short articles for the press upon sanitary subjects, and the assistance of Boards of Health pamphlets upon the different zymotic diseases, and on house ventilation, disposal of garbage, and kindred subjects.

Dr. Lee, of Philadelphia, presented a very able paper upon leprosy. His opinion was that the disease was only contagious through inoculation. On the contrary, one doctor held that the disease was neither infectious nor contagious, giving several facts in defense of his theory.

Dr. Orme's report on leprosy was next presented to the conference by Dr. Ruggles, but no conclusion was arrived at by the meeting.

The next subject under discussion was the Interstate Quarantine law. Dr. Ruggles explained fully the position of California in regard to this matter. Dr. Bryce, of Ontario, Canada, introduced the subject of disinfection in contagious diseases by the use of sulphurous acid, supporting his theory in a very plausible manner. Dr. Rutherford, of Texas,

combated Dr. Bryce's opinion, and explained that he had no faith in sulphurous acid, but firmly believed in the efficacy of chlorine gas and fire, especially in fire. Dr. Bryce then presented a valuable paper upon the effect of denudation of the land of forest trees.

The question of this Board upon the preservation of potable water from pollution was then brought forward by Dr. Ruggles, and after some discussion the conclusion arrived at was that the only way of preserving the potable waters was by preventing their pollution by stringent laws. Dr. Ruggles then presented the resolution of this Board asking the amalgamation of the conference with the American Public Health Association, which was immediately voted down as impolitic.

Upon adjournment of the conference, Dr. Ruggles proceeded to Washington, where he presented his letter of introduction to our Congressmen, Hon. T. J. Clunie and Hon. Marion Biggs, who received him most cordially and conducted him to President Harrison, to whom he explained the wants of this coast in the way of sanitary protection. From there Messrs. Clunie and Biggs took Dr. Ruggles to see Surgeon-General J. B. Hamilton. While conversing with this gentleman on the necessity of maintaining a strict quarantine on our southern border, a telegram was received from Dr. Tyrrell asking the appointment of a Government Inspector in New Mexico, as smallpox was reported epidemic. Surgeon-General Hamilton at once complied and telegraphed Dr. Tyrrell that he had appointed Dr. S. S. Herrick to the position.

Dr. Ruggles' verbal report was received and the thanks of the Board returned, with the request that Dr. Ruggles furnish a written report for publication in the next Biennial Report, which was carried.

The Secretary begged leave to report that, as detailed by Dr. Ruggles, he had received a letter from the doctor giving him an alarming account of the prevalence of smallpox in Mexico, and advising immediate steps be taken to prevent its extension to California. Your Secretary at once consulted Dr. Cluness, the only member of the Board available in an emergency, and he advised that I at once proceed to San Francisco and, if possible, engage the services of Dr. S. S. Herrick, and send him south and into Mexico to ascertain how far our State was threatened and to what extent smallpox prevailed. On arriving at San Francisco, I sought Dr. Herrick and obtained his consent to travel as far as El Paso, and points through Mexico and Arizona, at a salary of \$250 a month and expenses paid. I called upon the railroad authorities, explained to them the situation, and obtained every facility the railroad could offer to make the inspection complete. The Governor of the State at once consented to place \$1,000 at the service of the Board, out of the Contagious Disease Fund, of which sum your Secretary drew \$500, and on the 21st of May dispatched Dr. Herrick upon his mission. I herewith submit Dr. Herrick's report, which he will write out in full for the Biennial Report this year. The expenses and salary of Dr. Herrick for one month were \$398 40, leaving at the disposal of the Board \$101 60.

The Secretary's report was received, and his action unanimously indorsed.

The Secretary then read Dr. Herrick's report, which declared that, after careful inspection, he was of the opinion that although smallpox was undoubtedly present in Mexico and the valley of the Rio Grande, it did not immediately threaten California; but believing that it was epidemic in those places visited, and most likely to become epidemic when the

cold weather set in, California should have an Inspector constantly on the watch against the extension of the disease.

Dr. Herrick's report was received and accepted.

In view of the conclusion of the report, Dr. Cluness moved, and Dr. C. A. Ruggles seconded the motion, that it is the sense of this Board that a Government Inspector should be permanently located in the Rio Grande Valley, in the Territories of Arizona and New Mexico, for the protection of California from contagious and infectious diseases, and that Surgeon-General Hamilton be requested to make such appointment, at the expense of the National Government, which was unanimously carried, and the Secretary instructed to write Surgeon Hamilton without delay.

The Secretary reported progress in the codification of the health laws, but owing to the increased correspondence of the Board, which occupied his time, he would be unable to get them ready for incorporation in the Biennial Report without some clerical assistance.

On motion, the Secretary was authorized to employ the necessary assistance, in order to have the laws published in the Biennial Report.

In view of the increased correspondence of the Board, Dr. Cluness moved, which was seconded by Dr. Briceland, that the Secretary be authorized to purchase, for the use of the Board, a Remington or other first-class type-writer, which was carried.

Dr. Orme reported progress with his paper on leprosy for the Biennial Report, for which he had obtained some illustrative photographic views, but did not feel justified in going to the expense of having them lithographed for publication.

On motion of Dr. Cluness, seconded by Dr. Briceland, this Board authorized Dr. Orme to have his paper illustrated at the expense of the Board.

After discussion of various matters upon sanitation, there being no further business, upon motion, the meeting adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, October 11, 1890, at the usual hour.

Present—Dr. H. S. Orme, President; Dr. G. G. Tyrrell, Secretary; Dr. J. M. Briceland and Dr. C. A. Ruggles.

The minutes of the last meeting were read and approved.

The Secretary presented the following communication from the Stockton "Daily Republican:"

To the President and Members of the State Board of Health, Sacramento, California:

GENTLEMEN: The subscribers, publishers of the Stockton "Daily Republican," desire handling in the columns of their paper the live subjects of the day. In that connection they are pleased to say to your honorable body, and its members individually, that if you desire to furnish an article, or a series of articles, at least once a month, on health and its conditions on the Pacific Coast, or any other subject-matter pertinent to the knowledge and labors of your Board, which, in your judgment, would be of interest to the general public, the "Republican" will be pleased to publish it. Desiring a favorable reply, we are,

Your very obedient servants,

DORMER & RUGGLES,
Proprietors Stockton "Daily Republican."

It was moved by Dr. Briceland, and seconded by Dr. Tyrrell, that the communication be placed on file, its invitation be accepted, and that the thanks of the Board be returned to the gentlemen, through the Secretary, which was unanimously carried.

The following communication was received from Surgeon-General Hamilton.

TREASURY DEPARTMENT,
OFFICE OF THE SUPERVISING-GENERAL U. S. MARINE HOSPITAL SERVICE,
WASHINGTON, D. C., September 13, 1890. }

Dr. G. G. TYRRELL, Secretary State Board of Health, Sacramento, California:

SIR: I have respectfully to acknowledge the receipt, August 1st, of your letter containing a resolution of the State Board of Health of California, to the effect that a Government Inspector should be permanently located in the valley of the Rio Grande, in the Territories of Arizona and New Mexico, for the protection of California from smallpox and other infectious diseases, and that the appointment of said Inspector be requested of the Surgeon-General, Marine Hospital Service, the expense to be borne by the National Government. In the absence of Surgeon-General Hamilton, and because the request is for a permanent appointment, I have deferred taking action in the matter, but in the meantime have made inquiries concerning the smallpox in Mexican territory adjoining that of the United States, and in the valley of the Rio Grande. The whole matter will be brought to the attention of Surgeon-General Hamilton on his return from a tour of duty in Europe the present month.

By order of the Supervising Surgeon-General, Marine Hospital Service.

Respectfully yours,

WALTER WYMAN,
Surgeon M. H. S.

On motion, the communication was placed on file for further action.

A communication from Dr. Bailey, of Santa Ana, was read, complaining of the difficulty he had in having the health laws strictly obeyed, and asking some questions relating thereto. The Secretary read his reply thereto, which, on motion, was approved and the communication ordered on file.

The Secretary presented a manuscript copy of the health laws and ordinances as compiled by Dr. S. S. Herrick, and moved that the Board allow him a sufficient compensation for his labor.

It was, on motion of Dr. Ruggles:

Resolved, That the matter of compensation to Dr. Herrick be referred to a full meeting of the Board.

Carried.

Dr. Orme moved that the Secretary be requested to communicate with Dr. D. E. Salmon regarding the advisability of establishing a Board of the Bureau of Animal Industry upon this coast, for the purpose of considering the animal diseases prevalent in California, and adopting means for their suppression.

On motion of Dr. Briceland, seconded by Dr. Ruggles, the subject-matter was deferred until a fuller meeting of the Board was obtained.

In consideration of the various subjects which require the deliberation of a full Board, Dr. Briceland moved that when we adjourn we adjourn to meet in San Francisco on Monday evening at 8 o'clock, and the Secretary be requested to notify all the members of the San Francisco City Board of Health, and Health Officer, to meet with us in joint session for discussion on quarantine matters, legislation, and other subjects now pressing upon us, which was unanimously carried.

The Secretary reported progress with his Biennial Report, and expected to have it all in the printer's hands in a day or two.

On motion of Dr. Orme, the Secretary was requested to have two thousand copies of the report printed for general distribution.

There being no further business, the Board adjourned till Monday evening next.

G. G. TYRRELL, M.D.,
Secretary.

ADJOURNED MEETING OF THE STATE BOARD OF HEALTH

Was held in San Francisco, in the office of Dr. James Simpson, October 13, 1890.

Present—Dr. H. S. Orme, Dr. R. B. Cole, Dr. C. A. Ruggles, Dr. J. M. Briceland, Dr. G. G. Tyrrell, members of the State Board; Dr. Keeney, Health Officer of San Francisco, and Dr. Le Tourneau, Dr. Davidson, Dr. Fiske, Dr. McQuesten, members of the San Francisco Board of Health, by invitation.

The conjoined Boards met to discuss quarantine matters, as a precautionary measure against cholera.

Dr. Ruggles moved that the State Board should approve the action of the local Board in declaring Yokohama an infected port, and referred to Dr. Rucker, of Stockton, and others who have spoken slightly of this action, as quite underestimating its importance. This brought out a long and very interesting discussion of the subject of Asiatic cholera.

Dr. Le Tourneau said if anything, still greater precautions are necessary, as from latest accounts four fifths of the Chinese and Japanese attacked by the disease have died from it. San Francisco has never had a serious epidemic of cholera, and her location is such as not to favor the propagation of the disease. The duty of the Boards, however, extends to the country at large, as this city is the great gate through which orientals travel, and hence oriental infection would pass.

Dr. Cole said that unless something should be done the disease would make its appearance here, and having seen five thousand cases, he knows what a terrible calamity it is. The quarantine station, he said, is now so far advanced that a ship can be fumigated in from twenty-four to forty-eight hours, and the city can thus be protected. The apparatus, however, for disinfecting cargoes and baggage is not completed, but this, too, will be ready in from two to three weeks. In speaking of his experience with cholera, the doctor referred to a regiment which, under General (then Lieutenant) Grant, crossed the Isthmus of Panama in 1852, and of eight hundred soldiers but three hundred reached this city, the other five hundred having died of cholera on the way. Following in the strain of Dr. Le Tourneau, he said that the winds which blow across the San Francisco peninsula do not favor a spread of cholera, and that it thrives best in hot and damp atmospheres.

The motion of Dr. Ruggles, approving the efforts of the local Board, prevailed, and it was decided to visit the quarantine station on Sunday next with the express purpose, as Dr. Cole stated, of facilitating the completion of arrangements there, so that it may be speedily put in readiness to meet any exigency which may arrive.

The subject of the health of San Francisco was briefly discussed, and the action of the local Board, recommending the thorough flushing of

the sewers, was approved. The subject of quarantine was temporarily revived by Dr. Ruggles, and the Secretary was instructed to communicate with Surgeon-General John B. Hamilton, of Washington, asking as to the status of the quarantine station to be placed at San Diego, as provided by the Act of Congress.

Dr. H. M. Fiske then called the attention of the joint Boards to the growth of leprosy among white people in this State, and pointed out the necessity of a State hospital. He said that there were nine cases in this city, and the man who is most afflicted, a native of Massachusetts, has never been outside of the United States. Absolute isolation is essential to the prevention of a spread of the disease, and therefore a State Lazaretto, under the control of the State Board of Health, is imperative.

Other members of both Boards corroborated what Dr. Fiske said about the prevalence of leprosy.

The latter then moved that the State Board take cognizance of the need of a leper hospital, and recommended that measures be taken for introducing a bill in the Legislature, appropriating a suitable sum for the purchase of a site, and the erection of a suitable building.

Dr. Le Tourneux seconded the motion, and it was unanimously carried.

The fact that there is but one Market Inspector in this city was the next matter considered, and the risk from infected foods and tainted meats being sold and consumed was very clearly defined.

Dr. Cole then moved that a committee of five should be appointed to consider this and other matters, including the appointment of a State Veterinary Inspector. The motion was carried, and a rider, to the effect that the committee on legislation should report on October 27th, also prevailed.

President Orme then appointed the committee as follows: For the State, Drs. Simpson and Cole, and for the city and county, Drs. Fiske, Le Tourneux, and Davidson.

The visiting Board having retired, the subject of compensation to Dr. S. S. Herrick, for his labor in compiling the health laws of the State, was considered, and on motion, it was unanimously agreed to allow him the sum of \$75.

Meeting adjourned.

G. G. TYRRELL,
Secretary.

ADJOURNED MEETING OF THE STATE BOARD OF HEALTH

Was held in San Francisco October 18th, for the purpose of visiting and inspecting the new quarantine grounds and station at Angel Cove.

The following gentlemen formed the inspecting party: Drs. H. S. Orme, of Los Angeles, Charles Ruggles, of Stockton, R. Beverly Cole, of San Francisco, and G. G. Tyrrell, all of the State Board of Health; Drs. McQuesten, Fiske, Le Tourneux, and Davidson, of the San Francisco Board of Health; John Hoesch, Quarantine Officer Lawler, Health Officer Keeney, Dr. Bailhache, Dr. J. C. Tucker, of the United States Pension Board; Dr. William Martin, U. S. N.; Dr. Yeamans, City Physician; Dr. Sternberg, U. S. A., and Drs. Donnelly, Herrick, and Mackintosh.

The trip over was delightful. Arriving at the Cove the party was received by Colonel Bridges, who explained the plan of the station and escorted the visitors through the various buildings, nearly all of which are completed. At the wharf, where it is said two ocean steamers may be accommodated should occasion require, the concrete foundations are being laid on which will be placed the three large disinfecting boilers already described in the "Chronicle." The boilers are now on the wharf. The nearest building to the wharf is that known as the "barracks," where passengers of quarantined steamers will be accommodated during the disinfection of vessels and their cargoes. The house is much more comfortable than the name may imply. It has a frontage of 170 feet and a depth of 70 feet, and will be so fitted that none of the passengers who may be detained there will have cause for complaint.

Almost opposite the "barracks," on the side of the horseshoe which forms the pretty little cove, is the lazaretto where patients will be treated. It will accommodate about fifty patients. Joining it is a building in which will be located the dispensary and quarters of the nurses and attendants. Upon the hillside, some distance from the shore, are two buildings in which will be the quarters of the physicians and medical staff, the officers of the station, and the home of the Surgeon-in-Chief, who, it is said, will be Dr. Macintosh.

The visiting physicians inspected them, and expressed themselves as highly pleased with the plans of the station and the manner in which they have been carried out. They also paid particular attention to the water supply, which is obtained from a spring. The reservoir adjoining the spring holds about twenty thousand gallons. From it water is pumped to five tanks with a combined capacity of thirty-five thousand gallons. The flow from the spring is so strong and constant that the two pumps in the engine house working together for eight hours have not emptied the reservoir.

After lunching in the old ranch house on the hillside where Colonel Bridges has his quarters, the physicians discussed the station, its condition and its needs at length. On motion of Dr. Cole, it was decided to be the consensus of opinion of the gentlemen present that, taking into consideration the topography of the site and its adjacency to a swift current, the suggestion of Dr. Bailhache, to have the offal from the station carried to the sea in pipes, is the most salutary and economical.

Dr. Bailhache explained that the offal would be disinfected before it was sent into the bay. The current in Raccoon Straits, one thousand feet from the station, is one of the strongest in the bay.

It was also resolved by the visiting physicians that the station and the site were all that could be desired, and that the Government officials in charge, and Colonel Bridges, the constructing engineer, should receive the greatest approbation for their work.

Dr. Cole called attention to the danger of infection from vessels coming from Chinese ports, and moved that a presentation of that fact be made to the Federal Government, with the request that the station be completed and opened for patients as soon as possible.

The motion was carried, and Drs. Cole, Ruggles, and McQuesten were appointed a committee to memorialize the Government.

Speaking on this question, Dr. Ruggles said he was assured that President Harrison would do everything possible to advance the station, as

he knew from a conversation he had had with him that the President had the interest of the coast at heart.

It was said also that many improvements would be introduced at the station not known at others, as Surgeon-General Hamilton had declared it his intention to make the station the model one of the country.

A portion of the party went around part of the island in Colonel Bridges' steam launch, and upon their return expressed their great delight at the site and all its surroundings.

The party returned to this city at 5 o'clock. On the homeward trip Lieutenant Runcie, U. S. A., representing General Gibbons, the "McDowell's" Captain, and Messrs. Bailhache and Bridges, were again thanked for having afforded the occasion for the enjoyable excursion.

The State Board then adjourned to meet in San Francisco when called upon by the legislative committee.

G. G. TYRRELL,
Secretary.

ADJOURNED MEETING OF THE STATE BOARD OF HEALTH

Was held in San Francisco December 29, 1890, to take into consideration, with the Legislative Committee of the San Francisco City Board of Health, what legal changes are necessary in our present health laws, and what additions thereto are absolutely necessary for the welfare of the State.

Present—Drs. Simpson, Cole, Ruggles, and Tyrrell, of the State Board, Drs. Le Tourneux and Davidson, of the City Board of Health, and Dr. S. S. Herrick, of San Francisco, by invitation.

Dr. Orme, the President, being unavoidably absent, Dr. R. Beverly Cole was unanimously voted to the Chair.

Dr. Tyrrell stated that some of our health laws imperatively demanded amendment to make them effective, and proposed submitting to the Legislature an Act to amend Section 3064 of the Political Code, whereby the words "eighteen hundred and eighty-seven" will be changed to "eighteen hundred and ninety-one," and thus remove the objection to it which now renders it legally inoperative. He also proposed to reintroduce the Act amending Sections 3077, 3078, 3080, and 3082 of the Political Code giving compensation for the filing of deaths, births, and marriages; and also an amendment to Sections 337 and 378 of the Penal Code, substituting the word "knowingly" for "willfully." These are all the amendments he proposed asking for.

It was also proposed to introduce an Act appointing a State Sanitary Inspector; also an Act appointing a State Veterinary Surgeon; also an Act to establish a State Hospital for Lepers; also an Act to replenish our Contagious Disease Fund; also to place \$5,000 on the apportionment bill for the State Analyst, and to amend the Act establishing a State Board of Health by amending a section giving its members \$10 a day, in addition to their traveling expenses, when on duty for the State.

Dr. S. S. Herrick read a communication from Dr. H. S. Orme, in which the following amendments were considered: Chapter 24, 1889, relative to vaccination, has no penal clause. Section 377, Penal Code, was amended in 1889, so as to restrict its application to violation of the Act relating to registration of deaths and disposal of dead bodies. Its full

application should be restored, so as to reach violations of all sanitary laws.

The execution of the Act of 1889, relating to the sanitary condition of factories, shops, etc., was placed in the hands of the Commissioner of Bureau of Labor Statistics, but no extra funds or employes were provided for. Its execution should be vested in local health authorities.

A new section (2984) should be added to the Political Code, providing for a State Sanitary Inspector; also, another (2985) providing for a State Veterinarian.

A general Act is needed empowering all cities having Boards of Health or Health Officers, and a population of not less than five thousand, to have one Health Inspector; cities having a population of not less than thirty thousand, to have one Health Inspector and one Market Inspector; cities of more than thirty thousand, to have one Health Inspector for every thirty thousand inhabitants, and one for the residual fraction above one third of that number, and one Market Inspector for every sixty thousand inhabitants, and one for the residual fraction above one third of said number.

An Act is needed to establish a State Leper Hospital; the site to be selected and buildings erected under the advice and supervision of the State Board of Health; the Medical Officer and employes to be chosen by said Board; annual expenses to be provided by the State, but every county to be charged pro rata with the expenses of patients sent to the hospital.

These several suggestions having been discussed by the members present, it was agreed, at the suggestion of Dr. Ruggles, that a penal clause be added to the Vaccination Act, by making a disregard of the law sufficient cause for deprivation of the school appropriation for that district so long as disobedience is continued.

It was resolved to allow the sanitary condition of factories to continue in the hands of the Labor Bureau until a more convenient season for taking it up.

It was also agreed that the matter of a State Veterinarian be referred to the Veterinary Association for action.

The Sanitary Inspector was agreed upon. The Inspector bill was modified so as to omit the clause of five thousand, and commence with cities of ten thousand or more inhabitants. It was also proposed that we ask for \$10,000 for a leper hospital.

Dr. Cole thought we had no right to ask for \$5,000 for the State Analyst, as the mineral waters of the State belong to individuals, and the State has no authority to use its funds for the benefit of individual owners.

After some further discussion on ways and means, the meeting, on motion, adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary, January 13, 1891, at the usual hour. Present—Dr. H. S. Orme, President; G. G. Tyrrell, Secretary; Dr. J. M. Briceland, Dr. C. A. Ruggles, Dr. W. R. Cluness, members, and Dr. S. S. Herrick, by invitation.

The minutes of the last meeting having been read and approved, the Secretary read a telegram from Surgeon-General Hamilton, relating to the quarantine in San Diego, as follows:

WASHINGTON, D. C., October 15, 1890.

Dr. G. G. TYRRELL, Secretary State Board of Health, Sacramento, Cal.:

Time thus far has been consumed in getting site, several having been selected and possession refused. Good site finally purchased, and plans for buildings are now in preparation.

J. B. HAMILTON,
Surgeon-General.

A reply was sent by Dr. C. A. Ruggles to a communication addressed to Surgeon-General Hamilton, by the committee appointed for that purpose, at the meeting of the conjoined Boards of Health, held in San Francisco, October 18th, relative to finishing the quarantine station at Hospital Cove, Angel Island, stating:

"That an additional appropriation had been asked of Congress for the building of the boarding steamer, and the completion of the building omitted from the plan on account of lack of appropriations."

It was moved by Dr. Ruggles that the subscription of the Board to "Sanitary Record" be renewed and the bill paid. It was also moved that the bill for subscription for "Sanitarian" be paid, and our subscription for one copy be renewed.

A communication from the Lorin Sanitary District, and the action of the Secretary regarding the disposition of the matter, was approved.

A communication from E. O'Brien, Health Officer at Merced, stating that a leper was discovered on Merced River and asking how he could dispose of him. The Secretary replied that the county would have to care for him, as the State had made no provisions for such cases, as the county was usually responsible for his isolation and safe keeping.

On motion, the reply of the Secretary was indorsed and his action approved.

On motion of Dr. J. M. Briceland, seconded by Dr. Cluness, the Secretary was instructed to draw up a bill to procure a fund for prevention of contagious and infectious diseases, which is necessary for our protection.

On motion of Dr. Briceland, seconded by Dr. Cluness, the Secretary was instructed to prepare a bill for the erection of a leper hospital and the purchase of a site.

On motion of Dr. Cluness, the Secretary was instructed to urge the passage of the bill appointing a State Sanitary Inspector.

Dr. Cluness moved that an Act be prepared to amend Section 378 of the Penal Code, by inserting the word "knowingly" for "willfully," which was carried. Also, to amend Section 3064 and Section 3077 of the Political Code, which were carried.

The Secretary was also instructed to amend the Act organizing a State Board of Health, by adding a section giving the members \$10 a day while engaged in the duties of the Board.

On motion of Dr. Orme (Cluness in the chair), seconded by Dr. Briceland, the following resolution was adopted:

Resolved, That the Secretary of this Board be instructed to communicate with Hon. D. E. Salmon, Chief of United States Bureau of Animal Industry, and with our Senators and Representatives in Congress, to the end that a branch of said Bureau may be established in California, inasmuch as no such branch now exists west of the Rocky Mountains.

Which was unanimously carried.

There being no further business, on motion of Dr. Briceland, the meeting adjourned.

G. G. TYRRELL,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held in the office of the Secretary on April 20, 1891.

Present—Dr. W. R. Cluness, Dr. C. A. Ruggles, Dr. J. M. Briceland, Dr. G. G. Tyrrell, Dr. H. S. Orme, Dr. R. B. Cole; and by invitation, Dr. J. R. Laine, Dr. P. C. Remondino, Dr. C. W. Nutting, and Dr. W. G. Cochran.

The minutes of the last meeting having been read and approved, the Secretary read the following communication from the Bureau of Animal Industry in reply to the communication requesting the organization of a branch of the Bureau west of the Rocky Mountains:

WASHINGTON, D. C., March 11, 1891,

Dr. G. G. TYRRELL, *Secretary State Board of Health, Sacramento, Cal.:*

DEAR SIR: I am in receipt of your favor of the 2d instant, transmitting resolution adopted by your Board, requesting you to communicate with me with the object of having a branch of this Bureau established in California. In reference to this I would say that the work of this Bureau is carried on by stationing inspectors or agents in localities where any line of work which we have in charge needs to be carried on. As we have a number of different lines of work, such as the scientific investigation of diseases, the eradication of pleuro-pneumonia, the inspection of animals and meats for export, etc., I would be glad to hear further from you as to the line of work that your Board thinks the Bureau should undertake in California.

Very respectfully,

D. E. SALMON,
Chief of Bureau.

It was moved that the communication be received and the matter be referred to the incoming Board. Carried.

The following communication was read by the Secretary and ordered placed on file:

OFFICE OF THE IOWA STATE BOARD OF HEALTH, }
DES MOINES, April 1, 1891. }

To all Undertakers and Railroad Companies:

By reason of the frequent shipment of the bodies of persons dead from diphtheria, under the statement that the cause of death was "heart failure," or some other sequelae of that disease, and non-contagious, thereby greatly endangering human life, at a meeting of the Iowa State Board of Health, held Thursday, November 20, 1890, it was ordered that the transportation of the bodies of persons dead from diphtheria be prohibited in this State, and that the word "diphtheria" be stricken out from Rule 2, of the Rules and Regulations for the Transportation of Corpses, and that the word "diphtheria" be inserted in Rule 1, after the word "smallpox." Undertakers, baggagemen, and railroad station agents are hereby notified to govern themselves accordingly. The following resolution was also adopted:

"Resolved, That a return of a death made by a physician giving 'heart failure' as a cause of death, shall not be deemed a sufficient return, and such must be returned to the physician who made it for the proper correction and definition."

J. F. KENNEDY, M.D.,
Secretary.

Dr. R. Beverly Cole then moved that the above communication from the State Board of Health of Iowa be indorsed, and trust that the incoming Board will take such steps in respect to the resolution contained therein as will do away with the vagueness of certificates of death stat-

ing the cause of death to be "heart failure," "dropsy," "fever," "child-birth," "colds," etc., which was unanimously carried.

An invitation to appoint delegates to the National Conference of State Boards of Health was received and referred to the new Board for action. Same disposition was made of invitation to attend International Congress of Hygiene.

The attention of the Board having been called to a quack advertisement, as follows:

The State Board of Health, appointed by the Governor of California (and composed of physicians) to see that none practice medicine or surgery in this State without they are perfectly qualified to do so, have examined the diplomas of the New York specialists and declare them correct, and authorize them to practice medicine and surgery in California, and they hold certificates from the State Board of Health of California to that effect.

It was moved by Dr. Cluness, and seconded by Dr. Cole, and carried, that the Secretary be instructed to contradict, by telegraph to the San Diego "Union," the above untruth.

The Secretary then read the following telegram, which, having been signed by each member of the Board, was at once dispatched to San Diego, the present quarters of the "New York Specialists:"

OFFICE STATE BOARD OF HEALTH.

To San Diego "Union:"

The statement advertised by parties calling themselves "The New York Specialists," that they hold certificates from the State Board of Health of California, entitling them to practice medicine and surgery in the State, is absolutely false, malicious, and calculated to deceive the public.

The following communication from the American Public Health Association was ordered received and placed on file:

To G. G. TYRRELL, Secretary State Board of Health, Sacramento, Cal.:

DEAR SIR: At the eighteenth annual meeting of the American Public Health Association, held at Charleston, S. C., December 18-19, 1890, the following vote was passed: Voted, to instruct the Secretary to advise each State Board of Health which has not already done so, to issue directions to all local Boards of Health and Health Officers in reference to the preparation and proper use of disinfectants, basing such directions upon the reports of the Committee on Disinfectants of the Association.

Respectfully submitted.

IRVING A. WATSON,
Secretary.

The following gentlemen having been appointed by Governor Markham as members of the State Board of Health, presented their credentials, which were received, and the members welcomed to their seats by President H. S. Orme: Dr. C. W. Nutting, of Etna Mills, vice Briceland, term expired; Dr. P. C. Remondino, of San Diego, vice J. M. Simpson, term expired; Dr. W. R. Cluness, vice self, unexpired term; Dr. C. A. Ruggles, vice self, term expired; Dr. J. R. Laine, vice Tyrrell, term expired; Dr. W. G. Cochran, of Los Angeles, vice R. B. Cole, term expired.

It was moved and seconded that Dr. Tyrrell be requested to act as Secretary during the organization of the new Board. Carried.

Nominations for President being in order, Dr. Ruggles offered the name of W. G. Cochran, of Los Angeles, for that position. Nominations were closed and ballot ordered, six votes being cast. Dr. Cochran received five, and Dr. Ruggles one. Dr. Cochran, having received a majority of the votes cast, was declared duly elected President.

Nominations for Secretary being in order, Dr. Cluness was placed in

nomination by Dr. C. W. Nutting. Dr. J. R. Laine was nominated by Dr. P. C. Remondino. Ballot being ordered, six votes were cast. Dr. Cluness received one vote, and Dr. Laine received five votes. Dr. Laine having received a majority of the votes cast, was declared duly elected to the office of Secretary of the Board.

G. G. TYRRELL, M.D.,
Secretary.

THE REGULAR MEETING OF THE STATE BOARD OF HEALTH

Was held at 10 P. M., April 20, 1891.

There were present C. A. Ruggles, of Stockton; W. G. Cochran, of Los Angeles; P. C. Remondino, of San Diego; C. W. Nutting, of Etna Mills, and W. R. Cluness and J. R. Laine, of Sacramento.

The meeting was called to order by Dr. C. A. Ruggles, who appointed Dr. G. G. Tyrrell, the late Secretary, to act as Temporary Secretary.

The first business in order being the election of a President, Dr. C. A. Ruggles placed Dr. W. G. Cochran in nomination, and he was unanimously elected.

Upon taking the chair, Dr. Cochran declared the next business in order to be the election of a Permanent Secretary. Dr. C. W. Nutting placed Dr. W. R. Cluness in nomination, and Dr. P. C. Remondino nominated Dr. J. R. Laine. A canvass of the ballots showed six votes to have been cast, one of which was in favor of Dr. Cluness and five in favor of Dr. J. R. Laine. The President thereupon declared Dr. Laine duly elected Permanent Secretary of the State Board of Health.

Dr. Ruggles then moved that the Secretary be instructed to obtain a correct census report of cities and towns furnishing mortuary reports, and to compute the percentage of deaths from such corrected reports. The motion was adopted, as was also the motion by Dr. Ruggles to instruct the Secretary to announce to local Boards of Health that reports giving heart failure, dropsy, colds, childbirth, and such like vague terms as causes of death in their monthly mortuary tables, will not be regarded as sufficient nor satisfactory; and that a recommendation be made that specific terms, such as are recognized in medical nomenclature, be invariably employed to designate the cause of death.

Dr. Ruggles gave notice that he would bring up Section 2979 of the Political Code for discussion at the next meeting, so as to get a better understanding as to the legal rights and status of the State Board of Health with reference to the sanitary requirements of the various public institutions receiving State aid and support.

The Board then adjourned, to meet at the office of the Secretary at 9 A. M., April 22d.

J. R. LAINE,
Secretary.

AN ADJOURNED MEETING OF THE STATE BOARD OF HEALTH

Was held at 9 A. M., April 22d, at the office of the Secretary, there being present Drs. Cochran, Remondino, Nutting, Ruggles, and Laine.

The minutes of the previous meeting were read and approved. It was

ordered that the codified laws of California relating to sanitary affairs should be obtained from the State Printing Office and properly distributed.

The Board, after a further discussion of matters relating to perfecting its efficiency, adjourned until the quarterly meeting in July.

J. R. LAINE,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held at the office of the Secretary on July 6, 1891, at 8 P. M.

There were present Drs. Cochran, Ruggles, and Laine. Communications from Drs. Remondino and Nutting were read, giving reasons for their absence.

The minutes of the last meeting were read and approved.

The resignation of Dr. Julius Rosenstirn was read and ordered placed on file.

Dr. P. C. Remondino was duly elected a delegate to represent the State Board of Health at the meeting of the American Public Health Association to be held at Kansas City, Mo., in October, 1891.

There was a lengthy and earnest discussion of various matters relating to public sanitation, after which the Board adjourned, to meet at the call of the President.

J. R. LAINE,
Secretary.

THE STATE BOARD OF HEALTH MET IN REGULAR SESSION

At 8 P. M., October 19, 1891.

Present—Drs. W. G. Cochran, C. W. Nutting, C. A. Ruggles, and J. R. Laine.

The minutes of the previous meeting were read and approved.

The Secretary, Dr. J. R. Laine, reported having made an official visit to the town of Willows, on account of an outbreak of diphtheria. This action was approved.

The matter of a change in blanks for reporting deaths and diseases was, after a lengthy discussion, left to the discretion of the Secretary.

The Board then resolved to adjourn until the next day, in order to make a sanitary survey of the Folsom State Prison, the Stockton and Napa Asylums for the Insane, the San Quentin State Prison, the State University, and the Berkeley Asylum for the Deaf, Dumb, and Blind, and to adjourn from day to day until the surveys are finished.

FOLSOM PRISON.

The State Board of Health, consisting of Drs. Cochran, Nutting, Ruggles, and Laine, met at the Folsom State Prison on October 20, 1891, to inquire into its sanitary condition.

The condition of the convicts and the ventilation of the cells and buildings were carefully inspected and found to be good. The food supplies, including vegetables and bread, were of good quality, the food well cooked, and the dining-room and kitchen were in a creditable condition.

The prison drainage is of an ancient pattern, being a sewer running the length of the building, having wooden blocks opening in the middle of the wards, with no ventilation except into the buildings.

All liquid and solid refuse passes into this drain, which discharges its contents about three hundred feet in a northerly direction into the American River.

Warden Aull explained that he had under consideration an elaborate and well-considered plan for plumbing and draining the prison, with due provisions for ventilating the sewer outside of the buildings. The plan, as shown in a diagram submitted to the Board, is suitable, and will, when completed, free the prison from all danger from sewer gases. It is ascertained upon inquiry that, notwithstanding the imperfect system of drainage now in use, no diseases traceable to this as a cause have been noted. This is doubtless due to two facts: the perfect ventilation in the roofs of the buildings, and the rapid flow of the sewage and shortness of the sewer.

The sewer empties directly into the river, with no attempt to precipitate or detain its solid contents. This state of things, if long continued, must, in no small degree, pollute the water which is used for domestic purposes by forty thousand people within a distance of twenty miles.

In view of this condition, the following preamble and resolutions were unanimously adopted and ordered placed upon the minutes:

WHEREAS, The sewage of the Folsom State Prison flows directly into the American River twenty miles above Sacramento, which city obtains its water supply for public and domestic uses at a point immediately below the confluence of that stream with the Sacramento River; therefore, be it

Resolved, That the State Board of Health advise a discontinuance of this practice as detrimental to the public health and a violation of law; be it further

Resolved, That a recommendation be made that settling or chemical precipitation tanks be constructed at the outflow of the sewer, so that nothing but water deprived of injurious qualities shall be permitted to flow into the American River, and that the solid substances be precipitated and removed, and utilized as fertilizing material on the prison farm; and be it further

Resolved, That a copy of these resolutions be transmitted to George A. Knight, the attorney for the State Board of Health, with instructions to enforce a compliance with these recommendations.

STOCKTON INSANE ASYLUM.

The State Board of Health, consisting of Drs. Cochran, Nutting, Rugles, and Laine, met at the Stockton Asylum for Insane on October 21, 1891.

An inspection of the food supplies showed them to be of good quality. The kitchen was well furnished, but the windows and doors were unscreened and flies swarmed in myriads.

The same condition existed with reference to the bakery and dining-room for employes and the dining-room for patients.

The food was well cooked and was served in abundance. There was ample evidence that the management is kind, humane, and in a high degree creditable. The buildings are large, airy, and generally clean. The grounds are spacious, and, except in the rear of the kitchen where rags and bits of torn sacks and other refuse lay scattered around, are well kept. What meat was found in a screen meat stall was of prime quality, but the stall, notwithstanding the screen, contained many flies.

The water-closets are in detached buildings, and great efforts have been made to overcome the fatal error of locating such an institution where there is no fall for drainage. The closets are well kept and free from injurious odors.

The system of sewerage in use entails constant supervision and labor. Soil and waste pipes convey the sewage to branch sewers, converging to the main sewer, where it flows with sluggish current to a large catch-basin eighteen feet in depth. The sewers are constructed of redwood boards, and have square man-holes at about every hundred feet. In order to keep them pervious men are daily employed in floating a bit of wood, to which is attached a cord, from one man-hole to the other next below, and then dragging that section with a bundle of sacks. The last constructed building is sewerred with vitrified stone pipe, ventilated by square box man-holes. The sewage flows into the box sewer, whence it is discharged into the catch-basin, where a stationary engine pumps it into raised box flumes, which conveys it, diluted with artesian water, to adjacent vegetable gardens as combined irrigation and fertilizer. During the winter it continues its flow to a canal two miles distant, which leads to tide water.

So far no objection has been raised by neighbors to the use of sewage as fertilizing fluid. Neither need there be objection where such irrigation is sufficiently remote from habitations that it cannot offend the senses. One flume, however, carries sewage several hundred feet north-erly and then westerly to within one hundred feet of the southern extremity of the building occupied by female patients, where it is used to irrigate a plat of alfalfa. Along its entire length it leaks badly, the fluid spreading out on either side of the flume, offensive to both sight and smell.

Believing that the maintenance of this raised flume and the irrigation with sewage in such proximity to the structure occupied by the female patients is, or might be, injurious, the Board unanimously adopted the following resolution:

Resolved, That the Secretary of the State Board of Health is hereby instructed to communicate with the Superintendent of the Stockton Asylum for the Insane, calling attention to an open flume carrying sewage to an alfalfa patch on the south side of the building occupied by female patients, and recommending a discontinuance of this practice and the removal of the flume; substituting therefor an iron or vitrified stone pipe sunk in the ground; and that no surface irrigation be practiced in close proximity to the buildings occupied as habitations, except with water uncontaminated with sewage.

NAPA INSANE ASYLUM.

Drs. Cochran, Nutting, Ruggles, and Laine met at the Napa Asylum for the Insane on October 22, 1891, for the purpose of making a sanitary survey.

The kitchen, dining-rooms, and bakery were in excellent condition. The food supplies were of good quality, and appeared to be served in a palatable condition and in abundance. The fresh meats are subjected to refrigeration four days before using.

The site is admirably chosen for such an institution. The architectural proportions of the building, their external beauty of design and finish, harmonize with the beautiful grounds, which are adorned with choice shrubbery, and grace the broad avenue leading to the entrance of the buildings.

The asylum is overcrowded. The system of sewers for the institution is of vitrified stone pipe, laid in the basement from each water-closet to the central sewer, which leads to an open field remote from the building.

The pipes underneath the buildings often clog and burst, requiring frequent disturbance, which, in a degree, vitiates the atmosphere of the

basement. This would not be serious, inasmuch as it is freely ventilated, were it not that the heating apparatus is situated here, and the air used for heating the building obtained from the basement, and not from where it should be—the open air.

These faults are susceptible of removal by the single expedient of constructing water-closets and lavatories in the court, separate from the main building, but communicating with them, and abandoning all the water-closets in the main buildings. This would relieve the overcrowding by one hundred persons. By taking up the sewer and soil pipes now in the basement, and extending the main sewer in the most direct line to the new outside closets on to the smokestack of the powerhouse, the sewer would be complete. The waste pipes should be provided with a catch-basin, leaving an air space. That portion of the sewer which passes underneath the building should be of iron. The basement floor should be bituminized. These improvements would relieve the plethora, purify the basement, furnish improved closets, free the dormitories from sewer gases, and put a stop to the nuisance of breaking the clogged soil and sewer pipes underneath the buildings.

The Secretary was instructed to communicate with Superintendent Gardner, embodying the views of the State Board of Health, and urging that the Board of Directors for the Napa Asylum be importuned to put in execution the recommendations therein contained with the least possible delay, so that the improvements may be completed, if possible, before the rainy season sets in.

SAN QUENTIN STATE PRISON.

The State Board of Health, consisting of Drs. Cochran, Ruggles, Nutting, and Laine, met on October 23, 1891, for the purpose of inspecting the San Quentin State Prison.

The location of the prison is well chosen for drainage and salubrity. The arrangement of the buildings and their manner of construction show that they have been erected at different periods. A painful lack of harmony prevails in the appearance of the structures.

The fall for drainage is ample, and the plumbing, though not of modern construction, is nevertheless sufficient for present uses.

A water-closet in the tailor shop directly over the bakery is in bad condition, and should be speedily overhauled. The yard closet is of primitive construction, and too deep, and the building inclosing it is too low. Both could be remodeled at a trifling expense, so as to secure increased comfort and better ventilation.

The cells were clean and well ventilated, the yards were well policed, and everything about the grounds showed careful supervision. There was some objection to the wooden pails for night use in the cells, as they absorb the contents, and notwithstanding careful rinsing, are offensive to the smell. It was the opinion of the Board that they should be replaced, when convenient, with galvanized iron vessels.

A careful inspection of the food supplies was in every way favorable. The vegetables, bread, and meat were good. The food served at mid-day was well cooked and abundant. The general dining-room is, however, too dark and damp. The kitchen, though of ample dimensions for all culinary purposes, is totally unfit for the purpose. It is so dark as to require gas light at noon of a sunny day. Light comes in from

the west side only, where the sun is shut out by a four-story building. The east wall is blank, and drips with moisture, which collects in puddles on a badly-patched cement and bituminous floor, requiring constant sweeping and mopping to keep it dry. Ventilation is altogether inadequate, and the steam from the boilers condenses on the cold walls, increasing the discomforts and dismal appearance of the place.

The kitchen should be either removed to a more suitable place, or the east wall should be uncovered and pierced with windows for light and ventilation. This can be done by bulkheading ten feet of space outside of the east wall, which can then be perforated for windows. This space should be drained by a pipe running under the kitchen floor, and the floor covered with concrete.

If, in addition to these improvements, which may be deemed all that are necessary, the high building that obscures the sun on the west side were removed, the kitchen would be in a very good condition. As it now is, it is totally unfit for the purpose which it serves, and is, moreover, a disgrace to the institution.

STATE UNIVERSITY, BERKELEY.

The State Board of Health met at Berkeley, October 24, 1891. There were present Drs. Cochran, Nutting, Ruggles, and Laine.

The State University buildings were not fully inspected, owing to lack of time. Sufficient information was, however, elicited from the Secretary of the Board of Regents to determine that a deficiency of water exists, necessitating the closing of all the water-closets adjacent to the University class-rooms during a great portion of the summer months. This condition borders on the scandalous, and amounts to a positive nuisance, which should admit of no loss of time in abating.

If the University plant is inadequate to supply the requirements of the institution, enough should be purchased from neighboring water companies to supply all needs.

It is difficult to realize how there can be a valid excuse for closing the closets of the University during term, when water is obtainable by purchase. The chief institution of learning belonging to the State should not be permitted to languish from want of water. The Board of Health is not in possession of sufficient data to determine what should be done in the premises, but it does strongly advise the procurement of an ample supply of water at any cost. It is not within the province of the Board to indicate how this should be done.

DEAF, DUMB, AND BLIND ASYLUM.

This institution was found to be in such an excellent condition as to require no extended comment. The grounds are admirably kept. The buildings are imposing and spacious, and the plumbing and drainage are of a modern and approved pattern.

The Board then adjourned until evening, when it again convened at the Palace Hotel in San Francisco, to consult with George A. Knight, the attorney for the State Board of Health.

After fully considering the work that had been done, the Secretary was instructed to communicate with the management of the different institutions visited by the Board, furnishing such recommendations as

had been made, and disclaiming all intention to pass strictures upon those in authority, or to disparage the efforts of those in charge, and expressing also a full apprehension of the many obstacles in the way of placing State institutions in an ideal condition.

The Board then adjourned until the next quarterly meeting in January, 1892.

J. R. LAINE,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held at the office of the Secretary on January 18, 1892, at 8 P. M.

There were present Drs. Cochran, Ruggles, and Laine. Letters were read from Drs. Nutting and Remondino, stating reasons for non-attendance, and promising to be present at the next regular meeting in April.

The minutes of the last meeting were read and approved.

Communications were read from Benjamin Lee, Secretary Pennsylvania State Board of Health, which were ordered placed on file, to be answered by the Secretary at his convenience.

A letter from H. N. Rucker, Medical Superintendent of the Stockton Insane Asylum, was ordered placed on file.

The Secretary was instructed to ascertain and report at the next regular meeting what has been done toward a compliance with the recommendations made by the State Board to the different public institutions with reference to their sanitary condition.

The Board then adjourned to meet in April.

J. R. LAINE,
Secretary.

THE REGULAR QUARTERLY MEETING OF THE STATE BOARD OF HEALTH

Was held at the office of the Secretary at 8 A. M., April 18, 1892.

There were present Drs. C. A. Ruggles and J. R. Laine.

There being no quorum, the meeting adjourned to convene at the call of the President at San Francisco the next day.

J. R. LAINE,
Secretary.

THE STATE BOARD OF HEALTH MET IN REGULAR ADJOURNED SESSION

At the Palace Hotel at 9 A. M., April 19, 1892.

There were present Drs. W. G. Cochran, P. C. Remondino, W. R. Cluness, C. A. Ruggles, C. W. Nutting, and J. R. Laine.

The minutes of the previous meeting were read and approved, also those of the adjourned meeting of the 18th.

The President stated that the purpose of holding a meeting in San Francisco was to hold a conference with the San Francisco Board agreeable to a request made six months before, and to discuss matters relating to coming legislation, which should be prepared for the session of the Legislature. It was also desirable, after meeting the San Francisco Board, to visit, if possible, the quarantine station on Angel Island in

San Francisco Harbor; also the Insane Asylum at Agnews and the State Normal School at San José.

The Secretary was instructed to confer with the San Francisco Board of Health and arrange for the meeting of the two Boards, and report at 9 A. M. Wednesday, April 20th.

The Board then adjourned until the next day.

J. R. LAINE,
Secretary.

THE STATE BOARD OF HEALTH MET IN REGULAR ADJOURNED SESSION

At the Palace Hotel, at 9 A. M. April 20, 1892.

There were present Drs. Cochran, Ruggles, Nutting, Remondino, and Laine.

The Secretary reported having made all possible efforts to have an early conference with the San Francisco Board of Health, but that the earliest date obtainable was 9 A. M. April 21st, at the City Health Office, in the City Hall.

The President expressed regrets that the meeting could not be held sooner, as the hour and date fixed would not admit of the Board leaving the city to complete the sanitary survey of the State buildings until after Thursday.

The Board then adjourned to meet at the San Francisco Health Office at 9 A. M. April 21, 1892.

J. R. LAINE,
Secretary.

THE STATE BOARD OF HEALTH MET IN REGULAR ADJOURNED SESSION

At the San Francisco Health Office at 9 A. M., April 21, 1892.

There were present Drs. Cochran, Ruggles, and Laine, of the State Board, Mayor Sanderson, Drs. M. Regensburger, S. F. Long, Geo. J. Bucknall, Health Officer James Keeney, Quarantine Officer Lawler, and attachés of the local health office.

Mayor Sanderson invited the State Board to address the conference on any subject that should properly come before the joint bodies.

President Cochran stated that in addition to the natural desire to meet, officially as well as personally, the members of the local Board, there were important subjects to be considered with reference to presenting bills relating to sanitary affairs to the next Legislature. If it should be determined to attempt any advancement in sanitary legislation, the measures proposed should be well considered, and the bills prepared in advance.

Dr. C. A. Ruggles believed that the State was in need of a hospital for lepers; that as matters now stood lepers were either allowed to remain at their homes with their families, or they are maintained in county pesthouses. He favored legislation which will provide a suitable retreat for lepers, to be maintained by the State.

Dr. Regensburger also favored such a course, but would go further, by providing also an asylum for incurables of all kinds. He believed that San Francisco received an undue proportion of incurables of the indigent class, so much, in fact, as to tax seriously the capacity of available accommodations for their comfort.

On motion of Dr. Cochran, the Mayor was authorized to appoint a committee of five, three from the State Board and two from the San Francisco Board, to confer with Geo. A. Knight, the attorney for the two Boards, and prepare a bill meeting the necessities of the situation, and cause the same to be introduced in the Legislature, and to use all honorable means in furthering its passage, until it becomes a law.

The Mayor appointed Drs. Cochran, Ruggles, and Laine, of the State Board, and Regensburger and Long of the San Francisco Board, to meet at the call of the Chairman.

Dr. Regensburger introduced a resolution disapproving the custom of baring the head at funerals, and cited a number of casualties resulting from the practice during the last two winters. The resolution was adopted, and the matter was referred to the Secretary of the State Board for further action.

The State Board, accompanied by P. H. Bailhache, Surgeon Marine Hospital Service, and Dr. Lawler, Quarantine Officer, boarded the Government tug-boat at the Clay Street Wharf and steamed around Angel Island to the quarantine station, on the north side of the island, where a landing was made at the wharf.

The Board, after a view of the premises from the wharf, returned to San Francisco and adjourned until 9 A. M. the next day.

J. R. LAINE,
Secretary.

THE STATE BOARD OF HEALTH MET IN REGULAR ADJOURNED SESSION

At the Palace Hotel at 9 A. M., April 22, 1892.

Present—Drs. Cochran, Ruggles, Remondino, Nutting, and Laine.

The President stated that owing to the unexpected detention of the Board at San Francisco, it would be impossible to complete the sanitary survey of State institutions during the present session. Drs. Laine and Ruggles were thereupon instructed to visit Agnews Asylum and the San José Normal School, if possible, before the close of the fiscal year. Dr. Cochran then presented the following communication, which was read by the Secretary:

SAN FRANCISCO, April 22, 1892.

To the members of the State Board of Health:

I desire to present my resignation as President of this Board, to take effect June 30, 1892, next, the close of the fiscal year of the Board.

I ask that my resignation be accepted and my successor elected at this meeting.

There are several reasons why I resign; one of which is, I feel that being President of this Board is a compliment that should be passed around among the members; another is, the distance from Los Angeles to the place of meeting. As long as I am President I feel under the greatest obligation to attend all of the meetings of the Board, and this is at times very inconvenient.

Permit me to express to each member my gratitude and appreciation for the honor you did me in electing me your President; and more especially, for the constant and uniform courtesy at all times extended to me by each one of you.

Very respectfully,

W. G. COCHRAN.

Dr. Ruggles begged Dr. Cochran to withdraw his resignation.

Dr. Cochran replied that he could not consistently do so, inasmuch as there were others who should share the honor of being President of the Board. Upon the urgent request of Dr. Ruggles, the Board refused

to accept Dr. Cochran's resignation, but his communication was ordered spread upon the minutes of the Board.

The Board then adjourned to meet at Los Angeles in May or June, at the call of the President.

J. R. LAINE,
Secretary.

THE STATE BOARD OF HEALTH MET IN REGULAR ADJOURNED SESSION

At 9 A. M., May 16, 1892, at Los Angeles.

Present—Drs. Cochran, Remondino, Ruggles, and Laine.

A letter was read from Dr. Nutting expressing regrets at his compulsory absence.

The Board then decided to make a sanitary survey of the State Reform School at Whittier, and of the State Normal School at Los Angeles.

THE REFORM SCHOOL AT WHITTIER.

This place was found to be admirably situated for the purpose for which it is intended. The grounds are sufficiently elevated to furnish ample fall for the drainage, which is all received in one common receptacle a few hundred feet west of the main building, and strained. The solid matter is utilized on the farm as a fertilizing agent, and the water deprived of its solids is used on the farm for irrigation purposes.

The lavatories and closets were in perfect order, and there was an abundance of excellent water for all necessary purposes. The accommodations for girls were altogether inadequate, but the dormitories for boys were quite sufficient for the number there at the time. They were clean, well aired, and there was sufficient bedding of a good quality.

The food placed on the tables was of good quality, ample in quantity, and well cooked. The supplies found in the store-room were of good quality. The butter and fresh meats were sweet and fresh. The whole place had an air of neatness. The Board were deeply impressed with the observable results of the State's endeavor to care for the youths attending the school. It was at once apparent that the influences bearing upon the boys were in many ways beneficial. Their appearance, instead of being sullen and depressed, was contented and cheerful. Seen at their studies, there was little to distinguish them from classes in boys' schools in other places.

In the paint shop, shoe shop, tailor shop, blacksmith shop, cabinet shop, on the farm, and about the gardens, there was the same cheerful disposition and willingness to perform the duties assigned to each, with little or no obtrusive supervision. The boys seemed to be put on their honor in the matter of behavior and general deportment.

The afternoon drill was performed with an alert precision of movement that would excite the admiration of the most enthusiastic National Guardsman. There was a noticeable absence of any suggestion of a reformatory. No locks or bars; no guards, and none needed. The school needs but the removal of the word "Reform" in its official appellation to make it an ideal as well as a model "State School." It might, with great propriety, be called the "State School," so that when a youth returns to private life he will not be handicapped by the stigma of having been an inmate of a reformatory institution. These youths are

congregated here to be trained into American citizens, and not to be punished for delinquencies, the scope and enormity of which their immaturity does not admit of their comprehending. The offenses for which they are sent to the school are not frequently such as necessarily indicate precocious depravity, but are, with few exceptions, rather evidences of ignorance, parental neglect, and an unrestrained excess of youthful energy.

Keeping the pupils employed, and directing simultaneously the mental, moral, and physical energies, proves to be an effectual and, it is believed, a permanent corrective.

With time fully occupied with study and congenial labor, with plenty to eat, good beds, clean clothes, and frequent baths, life is brightened, with a prospect of an honorable future as intelligent citizens. There is none of the depravity and degradation that follows an association with criminals in houses of correction and penitentiaries.

The Board, therefore, in view of the good to be obtained from such a course, ventures upon the verge of its official province to recommend a careful scrutiny of the methods at Whittier, and their results, in the belief that such observation will not only inure to the benefit of the youths at that school, but that the example may lead to the establishment of another on a similar plan in the interior of the State, and more centrally situated.

It is believed that such a course would prove economical to the State. It certainly would be an enlargement in the humane treatment of unfortunate boys and girls, and would convert them into law-abiding people, when, if left to their deplorable resources, they must inevitably entail a great expense to the commonwealth in their future conviction for crime, and their maintenance as criminals.

The Board adjourned until 9 A. M. the following day.

J. R. LAINE,
Secretary.

THE STATE BOARD OF HEALTH MET IN REGULAR ADJOURNED SESSION

At 9 A. M., May 17, 1892.

Present—Drs. Cochran, Ruggles, Remondino, and Laine.

The Secretary was instructed to supply each member of the Board with the necessary postage and stationery.

The Board appointed Drs. Ruggles and Remondino a committee to inspect the County Hospital at San Diego. A visit was then made to the State Normal School at Los Angeles, where the sanitary condition was found to be unexceptionable.

Before adjourning the Secretary reported having caused to be printed two circulars, in a "Preventive Disease" series, one of which is addressed to the clerical profession, treating on the "Dangers of Public Funerals of those who have died from Contagious and Infectious Diseases," and another addressed to the clerical profession and officers of secret orders and beneficiary societies, on the "Dangers from the Removal of the Hat at Funerals."

The Board then adjourned until the next regular meeting, or to meet at the call of the President.

J. R. LAINE,
Secretary.

REPORT OF THE SECRETARY.

To the State Board of Health:

GENTLEMEN: The system of public hygiene in California, which comes under the police power of the State, is such that the executive administration is everywhere imposed upon the local Boards.

Sanitation, in its modern sense, is, in obedience to natural laws, a product of advanced civilization. Like civilization, it is a development of man's resources, and is, moreover, a true index of his ability to exist. A recognition of the necessity of obedience to rules that by common consent are termed "sanitary" and "hygienic," has led to the enactment of public health laws in all civilized countries. But it was reserved for the present generation to develop it to the prominence which it has now reached. By virtue of social and political organization there becomes vested in every nation, in every State, and, by delegation, to every municipality, a power to defend itself against disorder, indecency, disease, and discomfort. From its very nature such a power is incapable of precise definition or exact limitation. The police power of the State extends to all matters affecting public health and the public morals. It is not restricted to a narrow limit, but extends over a wide domain of social life. It has authority to assert that individual convenience must often yield to public convenience, and that individual profit must often be subordinated to the public good, and individual notions of what is decent and proper shall give way before the general opinion as to what is unbecoming. It emphasizes, in terms that cannot be misunderstood, that all property, of whatever nature, shall only be used by its owner in such a way as not to injure his neighbor. Not only is its exercise to be for the safety of life and property, but also in legislative discretion it must be applied to the proper rules of life, so that the good order, health, and morals of the community may be protected and lifted to a higher plane. So thoroughly is this power of the very essence of all social order, that it cannot be evaded, resigned, or relinquished. The authorities cannot give up definitively this police power. It inheres in the National Government for national purposes, in the State Government for State purposes, and when delegated to county, city, or town, for local purposes.

It might seem that a vigorous exercise of this power might result in an infringement of personal liberty; but the individual liberty which is being evolved in our history, and whose perfection must be the ideal of every lover of humanity, is a harmony between the volition of the intelligent citizen and the needful requirements of organized society. When a law satisfies the educated desires of those who obey it, there can be no infringement of individual liberty. But there are times when the strong arm of force must be invoked for the protection of society. There is sometimes found a vested interest in nuisances. The regulation of the sale of intoxicating liquors, the suppression of gambling, the establishing of quarantines, the isolation of infected persons, the removal of

slaughter-houses from within the limits of towns and cities, the regulation of building so as to conform with plumbing and fire laws, the removal of cemeteries from crowded towns, the construction of sewers and drains for homes at the expense of the owners, are all in the direction of public health and public morals, and should be urged and insisted upon, not only by the citizen, but by public opinion, pulpit, and press, aided by the constabulary force of the State.

LOCAL SANITARY REGULATION.

The larger cities of California have for many years enacted by ordinance laws for the regulation of their local sanitary affairs, aiming to control and prevent the most common and unwholesome nuisances, such as relate to drainage, accumulated filth, and the defilement of water supplies. They have also attempted, with varying success, to make compulsory the notification of infectious and contagious diseases; also, the reporting of births.

The smaller towns, while often manifesting the deepest interest in local affairs, do not frame their ordinances suitable to their local needs, or fail to make them effective by adoption by the Town Trustees or County Supervisors. The communications from correspondents indicate, however, a commendable willingness on the part of citizens generally to aid the Health Officers and Inspectors in every way in their power. Very few recalcitrants have been reported.

Of all the aids to good hygienic results which Boards of Health employ, there is none which exceeds in value that of an efficient Health Officer or Sanitary Inspector. Boards of Health are divided into two classes. The same may be said of nations, political parties, and churches. One will be progressive and active in ferreting out all suggestions of conditions prejudicial to public health. The other will never voluntarily take cognizance of any unsanitary conditions. They feel it their duty to take no action until the danger is brought to their knowledge by a formal complaint of other parties. However dignified this conception of the true functions of a local Board of Health may be, it is far from a conformity with the practical sentiments of the age in which we live.

There have been frequent demands for the "sanitary laws" of the State by the local Boards. The Codes are rarely a part of a physician's library, and the Health Officer or Secretary of a Board often finds it necessary to consult an attorney to ascertain the scope of his duties. The attorney demands a fee. The physician acting as Health Officer is perhaps receiving a nominal salary of \$10 per annum for services which under other circumstances he would not perform at any price. The Trustees will not pay the lawyer, so the Secretary of the State Board is appealed to. He can only inform his correspondent as to the page and section of the Codes or Statutes that relate to his duties as to the subject-matter, but rarely takes the time to write out the sections of the Codes.

In view of the urgent demands for the State laws on sanitary matters, by the correspondents of the State Board, it is deemed expedient to cause them to be printed as a part of this Biennial Report. While it will not be as interesting reading to many as papers and reports on sanitary subjects, yet it is believed that the publication of the laws relating to

public health will be more conducive to the organization and perfection of the health machinery of the State than the publication of any ordinary treatise.

There is in course of preparation a code of sanitary regulations to be issued by the Board, which will be for the instruction of local Boards. It is intended merely as a suggestive Code or outline for their requirements, to be used as a basis for their official action in framing their ordinances.

There is a singular difference in localities and communities with reference to their estimate of any kind of sanitary regulation. Take Redwood City, the county seat of San Mateo County, for example. Redwood City has about two thousand five hundred people, yet it has no Board of Health, and the District Attorney, though an estimable man and an able lawyer, is appointed Health Officer. When urged to send his monthly mortality report before the 10th of each month, he replied that he did not get them in time to enable him to do so; and Redwood City is excluded from the monthly reports of the State Board, because the lawyer Health Officer will not do what the medical Health Officer does—go to the undertakers and Superintendents of cemeteries and make up his report. Redwood City has the usual average of diseases and deaths as shown by the quarterly reports of the County Recorder, so that unusual salubrity of location cannot be advanced as an excuse for not having a Board of Health. It is mentioned merely as an example of unprogressive spirit, shiftlessness, and sanitary unthrift.

MORTUARY STATISTICS.

[For the fiscal year from June 30, 1890, to June 30, 1891.]

In making up the mortuary report for the fiscal year from June 30, 1890, to June 30, 1891, no record of the deaths that occurred during the month of March is included. It has since been found impossible to obtain the data necessary to make up the statistics of that month, which preceded the incumbency of the present Secretary.

The total number of deaths from all causes during the year was 12,820. Estimating the population of California to be 1,250,000, it would make the death rate 12.24 per thousand of the population.

Smallpox.

There were but 4 deaths from smallpox during the year. This disease prevailed to a moderate extent in remote portions of the State, but in every instance it was easily controlled and finally stamped out.

Measles.

There were but 26 deaths due to measles, 8 having occurred in May, 1891, and 5 in June of the same year. The preceding January of the same year claimed 5 deaths from the same cause.

Scarlatina.

There were 39 deaths due to scarlatina during the year, May, 1891, having furnished 9 of the deaths. The remaining deaths were distributed quite evenly throughout the year.

Diphtheria.

There were 488 deaths due to diphtheria, without estimating what occurred in March. As there were 60 deaths in February, and 56 deaths in April, it is fair to presume that there were 50 during the month of March. Adding this number to 488 makes a total of 538 for the year. This would correspond to 4.30 per thousand of population.

Influenza.

Influenza is credited with 50 deaths during the year, the fatality having begun in November. In December, 1890, there were 2 deaths; in January, 1891, there was 1; in February, 1891, there were 8; in April, 17; in May, 13; and in June, there were 7.

Whooping-Cough.

Whooping-cough caused 35 deaths during the year, 17 of which occurred in May during the prevalence of la grippe.

Typhoid Fever.

There were 334 deaths due to typhoid fever; 47 of these are classed on the table under the head of typho-malarial fevers. As the term "typho-malarial" would indicate the specific infection of typhoid fever, it must to all intents and purposes be considered identical with that disease. Inasmuch as the malarial complication is susceptible to remedy, while typhoid is not, it should be classed as typhoid. Its prevalence was quite evenly distributed throughout the year.

Cerebro-Spinal Fever.

Cerebro-spinal fever caused 73 deaths.

Respiratory Diseases.

There were 1,818 deaths due to consumption. Pneumonia caused 1,135. Pleurisy, 29. Bronchitis, 323. Other diseases of the respiratory organs caused 187 deaths.

This would show 3,492 deaths from chronic and acute respiratory diseases during the year. The greatest fatality was from November, 1890, to June, 1891.

Alcoholism.

One hundred and twenty-one deaths are credited to alcoholism, direct or remote, including delirium tremens.

MORTUARY STATISTICS.

[For the fiscal year from June 30, 1891, to June 30, 1892.]

The total number of deaths from all causes during the year were 15,847, making a death rate of 12.67 per thousand, estimating the population at 1,250,000.

Smallpox.

There were no deaths reported from smallpox during the entire year. Very few cases were reported to have prevailed except at the quarantine station on Angel Island, in San Francisco harbor, where it was so completely controlled as to be effectually stamped out.

Measles.

Deaths from measles numbered 84, distributed quite evenly throughout the year, is the sum of fatalities from that disease.

Scarlatina.

There were 103 deaths reported from scarlatina, the greatest fatalities beginning in December, 1891, when there were 15 deaths. There were also 15 deaths in January, 1892; 14 in February; 6 in March; 15 in April, and 14 in May.

Diphtheria.

This disease, as usual, shows a frightful mortality of 484, to which might be added 185 from croup, which makes 669 deaths due to this terrible disease. The fatalities during the different months of the year have varied so little that it is unnecessary to specify them, especially as a glance at the mortuary tables herewith appended will supply the information.

Epidemic Influenza—La Grippe.

During the year there were 223 deaths attributed directly to la grippe. Five occurred in July; 2 in August; 3 in September; 2 in October; 4 in November; 51 in December, 1891; 107 in January; 27 in February; 13 in March; 5 in April; 3 in May, and 1 in June, 1892.

California was visited by an epidemic of influenza during the winter of 1890-91, lasting until the following June. Its onset was simultaneous with reports of the disease in remote parts of the continent. There is reason to believe that it affected those where it could not have been conveyed by travel or other means of conveying the ordinary forms of contagious diseases. It prevailed in the Sacramento and San Joaquin Valleys, the foothill counties at an elevation of from one to four thousand feet, the vicinity of Truckee at an elevation of six thousand feet, and the foggy seacoast at the same time and in precisely the same manner. The dry region of the Colorado Desert at Needles enjoyed no immunity; in fact, suffered more in proportion to numbers than the cities and towns of Southern California.

There was another visitation during last winter, very much intensified, but in the main presenting the same characteristics with corresponding complications and sequelæ. Many who had the disease the first winter were again attacked, and others were afflicted with two and three attacks during the second winter. But few deaths were credited to it directly during the first winter; but during the second, when a familiarity with its clinical features had been very generally established, many deaths were reported, not only from the immediate effects of the epidemic, but more from its results and sequels.

This was especially observable in a great increase of diseases of the lungs, notably pneumonia and bronchitis.

As might be expected, the weak and sickly when attacked were the first to succumb; but these were not among the first to take the disease, and while not enjoying an immunity from it, showed no more susceptibility than the robust. The first to show its influence were those habitually exposed to out-door life. All observers agree that when one case appeared in a house nearly every member of the household had it thereafter. Those afflicted with phthisis-pulmonaris were affected in a marked degree when attacked, but it showed no marked predilection for this class, and many pronounced consumptives made good recoveries from la grippe, without showing any deviation in the course of the original disease. No attempt will be made to give the number of fatalities of the epidemic of the last two years. A perusal of the subjoined monthly circular of the State Board of Health will give a general idea of the deaths due to the immediate effects of the malady, and the more remote effects, which it has become the custom among insurance companies to sum up as "results of la grippe." These results have been of a Protean character in California. Pneumonia, bronchitis, catarrhal pneumonia, coryza, with depression and great anxiety, severe cough, dyspnoea, extreme soreness in the chest, pain in the back and limbs, stitches in the side, headache, diarrhoea, tonsillitis, pharyngitis, earache, dizziness, and mild delirium were some of the effects of the seizures. A proneness to pneumonia, with a tendency to relapse, was the condition of most patients after an attack. The strong and robust showed no exception to this tendency.

All were left with a sense of depression and lessened vitality. The force of the seizure was spent, in many cases, on the nervous system. Many of this class of cases have not yet recovered, but have progressively declined, losing flesh, and presenting the general symptoms of breaking down of the constitution.

It follows that a disease affecting so profoundly not only the nervous system, but nearly all the organs in the body separately or generally, as a catarrhal fever, must of necessity produce a violent shock on the great number of people who are always living on the brink of the grave, whose diseased hearts or brains, or lungs, or shattered nervous systems, or diseased kidneys have placed them in such a condition that the perturbing influence and sharp fever of la grippe is sufficient to make them easy victims. The same may be said of all epidemics. If a man afflicted with chronic nephritis takes la grippe, and dies during any of its complications, la grippe will be accredited with the cause, and not Bright's disease.

It is not intended to give the history of former epidemics of this disease, nor to descant on its clinical history and exciting cause. These have been pretty generally gone over during the two years that this unwelcome guest has been among us. It will be seen from the above that there has been a sameness of symptoms and general history with all accounts of its manifestations in other countries and other States. To present an opportunity of comparing the prominent features of general symptoms is all that this is intended to comprehend.

The facts in reference to the spread of epidemics of influenza, and the course of the disease in infected localities, are comprehensible upon no other theory than that of a specific infecting principle as its exciting cause. That this principle is carried over vast expanses in an incredible short space of time, producing its specific effects which we call

influenza or la grippe, over vast areas of land and sea without communication from man to man, is believed to be fully established. That when one person in a household is affected with it the infection is sufficient to produce the disease in the others, is accepted by many, and general observation tends in that direction. The medium of its communication is the atmosphere, and if a germ, it must possess the power of reproducing itself in that medium; otherwise, it would become lost by dispersion in traversing distances measured by oceans and continents.

Whooping-Cough.

Whooping-cough is credited with 94 deaths, being nearly three times the number during the previous year. This must be attributed, to a considerable extent, to prevalence of la grippe, which would necessarily increase the fatality of this disease.

Typhoid Fever.

There were 340 deaths from typhoid fever, to which must be added 22 which appear on the tables attributed to typho-malarial fever, making a total of 362 deaths from this cause. Like the preceding year, these fatalities were quite evenly distributed throughout the twelve months.

Cerebro-Spinal Fever.

There were 74 deaths from cerebro-spinal fever during the year, being one more than during the preceding year.

Pulmonary Consumption.

This disease, as usual, takes the lead in the cause of fatality, and heads the list with 2,304 deaths, being a considerable increase over the previous year, when there were 1,818 deaths. A glance at the tables will show that the highest mortality occurred during the height of the epidemic of la grippe.

Pneumonia.

There were 1,415 deaths from pneumonia, as against 1,135 during the previous year. Here again a glance at the tables will indicate that the highest number of fatalities occurred during the month when the highest number of fatalities from la grippe occurred, the disease having jumped from 94 in November to 315 in January.

A corresponding increase is shown in bronchitis and congestion of the lungs. Those months which show the largest number of deaths from la grippe show the largest number of deaths from chronic and acute pulmonary diseases.

Pleurisy.

Pleurisy is credited with but 24 deaths.

Bronchitis.

There were 461 deaths credited to bronchitis, and 139 to congestion of the lungs, while 164 deaths come under the head of other diseases of the respiratory organs. This would show chronic and acute diseases

of the respiratory organs to have caused 4,343 deaths during the fiscal year, which is an increase over the former year of 851.

Alcoholism.

Alcoholism, directly or remote, including delirium tremens, is credited with 192 deaths.

J. R. LAINE, M.D.,
Secretary State Board of Health.

MONTHLY REVIEW OF DEATHS AND PREVAILING DISEASES.

Reported to the State Board of Health from July, 1890, to July, 1892.

[Reprinted from monthly circular of State Board of Health.]

JULY, 1890.

Mortality reports received from 104 cities and towns throughout the State, containing an estimated population of 850,440, give the number of decedents as 1,132, which is a monthly percentage of 1.33 per 1,000, or an annual mortality of 15.96, which is an increased death rate over that of last month. This may in a great measure be attributed to the increased mortality from stomach and bowel disorders, especially cholera infantum among children. We find that the increased temperature during the month was a prominent factor in the causation of these diseases, and no doubt contributed greatly to their fatality.

CONSUMPTION caused nearly as large a mortality as last month, 150 deaths being attributed to it.

PNEUMONIA seemed to be favorably influenced by the warm weather, there being but 50 deaths recorded from it. Of these 34 occurred in San Francisco, the remainder in isolated cases throughout the State.

BRONCHITIS.—Twenty-one cases died from this disease, which is a marked decrease from last report.

CONGESTION OF THE LUNGS was reported fatal in 12 instances.

WHOOPING-COUGH caused 3 deaths.

DIPHTHERIA AND CROUP, collectively, were the cause of 24 deaths, which is a large decrease from the number reported last month. Of the 17 caused by diphtheria, 10 occurred in San Francisco, 3 in Sacramento, 2 in Los Angeles, and 1 each in Haywards and Anaheim.

CHOLERA INFANTUM is reported to have caused 82 deaths, which is the largest mortality in any one month this year. The deaths from this cause in June numbered 51 and in May only 6, showing conclusively how much the disorder is influenced by increased temperature.

DIARRHŒA AND DYSENTERY caused 31 deaths, which is a very marked increase indeed, nearly double the mortality of the preceding month.

SCARLET FEVER was fatal in 2 instances, one of which occurred in San Francisco and 1 in Sacramento.

MEASLES was fatal in 3 instances, 1 in San Francisco, 1 in Downey, and 1 in Los Angeles.

TYPHO-MALARIAL FEVER is credited with causing 1 death in Mendocino.

TYPHOID FEVER is reported to have caused, last month, 32 deaths, which is almost double the mortality in June from this cause, and indicates a laxity of hygienic care in the cleansing of our dwellings, or in the preparation of our food and drink.

REMITTENT FEVER caused 10 deaths, which is also a marked increase over last report.

CEREBRO-SPINAL FEVER was credited with 12 deaths, which is a decrease of nearly one half from last month's report; 8 of these deaths occurred in San Francisco, 2 in Watsonville, 1 in Alameda, and 1 in Jolon.

ERYSIPELAS caused no fatality during the month.

CANCER was fatal in 37 instances.

HEART DISEASE caused 75 deaths.

ALCOHOLISM proved fatal in 10 instances.

DEATHS FROM CAUSES not classified in this abstract numbered 499.

PREVAILING DISEASES.

Reports of diseases received from over 100 towns agree in general that the amount of sickness is limited in nearly every locality; no epidemic is prevailing in any part of the State, if we except, perhaps, measles and whooping-cough, which in a few towns prevail extensively. The many warm days that occurred in July produced, with other factors, a decided increase in stomach and bowel disorders, which in some cases were so severe as to warrant the name of cholera morbus. This severe form of vomiting and purging was noticed as—

CHOLERA MORBUS in Tehachapi, where it was quite prevalent; it was also noted in Williams, Fresno, Downey, Lodi, Pleasanton, Merced, and Sacramento.

DIARRHŒA AND DYSENTERY were observed with frequency in Oakland, San Francisco, Los Angeles, Chico, Alameda, Rio Vista, Gridley, Anaheim, Williams, Redding, Tehachapi,

Middletown, Truckee, Fresno, Downey, Bakersfield, Sausalito, Needles, Lakeport, Etna Mills, Lockeford, Stockton, Hollister, Sacramento, Ione, Calico, Oakdale, El Monte, Newman, San José, and Benicia.

CHOLERA INFANTUM is mentioned as present in a great number of places. In San Francisco it was quite prevalent; it was also noted in Oakland, Haywards, Alameda, Dixon, Davisville, Sacramento, Chico, Grass Valley, Ione, Los Gatos, Merced, Napa, Petaluma, Pleasanton, Rio Vista, Pomona, San José, Stockton, Vallejo, Gridley, Fresno, Gonzales, Jackson, St. Helena, and Cottonwood.

MEASLES was reported in Sacramento, where it is becoming quite prevalent. It also was noted in Middletown, Downey, Jolon, Sausalito, North San Juan, Hollister, Merced, St. Helena, Los Angeles, and San Francisco.

SCARLET FEVER.—A few cases were reported in Sacramento, San Francisco, Rocklin, Ontario, St. Helena, and Sausalito.

SMALLPOX was reported in North San Juan, but inquiry from Dr. George Farley, our Health Officer, elicited the fact that the report was a mistake, and without any foundation in truth.

DIPHTHERIA AND COUP.—Some sporadic cases of these diseases were reported in San Francisco, Sacramento, Rio Vista, Anaheim, Tehachapi, Truckee, Cloverdale, Downey, Elk Grove, Etna Mills, Haywards, Los Angeles, and Oakland.

WHOOPING-COUGH was noted in Sacramento, San Francisco, Merced, Williams, Truckee, Hanford, Ontario, Bakersfield, Lodi, Etna Mills, and North San Juan.

ERYSIPELAS.—Some cases of this disease were reported in Cottonwood, Knights Ferry, Fresno, Elk Grove, Bakersfield, Lodi, Eureka, Calico, Ione, and Merced.

TYPHOID FEVER is noted with increasing frequency in our sickness reports. Cases occurred during the month in Igo, Tehachapi, Fresno, Bakersfield, Needles, Lodi, Etna Mills, Eureka, Elsinore, Merced, El Monte, St. Helena, Sacramento, Angels Camp, Los Gatos, Healdsburg, Mendocino, Oakland, Vacaville, San Mateo, Rocklin, and San Francisco.

TYPHO-MALARIAL FEVER was observed in Livermore, Truckee, Hanford, Colfax, and Pleasanton.

REMITTENT AND INTERMITTENT FEVERS are noted in nearly all of our reports, as might be anticipated at this season of the year.

PNEUMONIA is mentioned in a decreasing number of our reports. Sporadic cases were noted in Sacramento, Igo, Jolon, Ione, Alameda, Angels Camp, Berkeley, Eureka, Folsom, Grass Valley, Los Angeles, Petaluma, Oakland, San Benito, Trinity, and San Francisco.

BRONCHITIS was somewhat prevalent in a mild form. It was noted in Igo, Rio Vista, Tehachapi, Downieville, Truckee, Fresno, Galt, Pleasanton, St. Helena, El Monte, Los Angeles, Pasadena, San José, Santa Barbara, and San Francisco.

CHOLERA ASIATICA.—This dread disease shows no sign of abatement in Spain; on the contrary, it is spreading rapidly through the provinces. We are, however, more concerned nearer home, the disease having made its appearance in Japan, to which we are so closely allied by commerce and individual intercourse. The disease having been so clearly proven to be contagious through excretions from the infected body, the utmost vigilance will have to be exercised to prevent the transportation of these poison germs to our shores. But suppose all vigilance fails, and cholera suddenly appears in our midst. The question that should present itself to every community in the State at this moment is: Are we prepared to repel the invader; are our cities, towns, hamlets, and individual premises in such a state of order and cleanliness that disease can find no accumulated filth in which to incubate its germs? If they are, we have nothing to fear, as it has been stated by good authority that the cholera germ is innocuous when it leaves the human organism, and that it requires another medium outside of man to mature and complete its infective properties. That medium is a soil moist and saturated with impurities. If this assertion is true, it necessarily follows that the most complete safeguards against the spread of cholera are a clean soil, untainted air, and pure water. The first may be attained by proper drainage, removal of superincumbent filth, garbage, and all accumulations of dirt within or near our dwelling places. Health Boards and Health Officers should now be more vigilant than ever, and enforce, with all the power the law gives them, the proper cleansing of the districts under their charge. They are the officers accountable to the people for the preservation of their lives when threatened by disease; their responsibility is great, and their remuneration should be adequate. We know that cholera cannot exist or extend when the means of its existence are destroyed. To do this is the work of local Boards of Health and Health Officers. No favoritism or dislike to prosecute offenders in the enforcement of the provision of the law should, for a moment, influence the health authorities when a great danger like the present menaces the community. It can be averted by every Sanitary Board and every Sanitary Officer doing their whole duty conscientiously, without fear or favor; whereas, putting off to a more convenient season that which should be done to-day, may be followed by an epidemic of one of the most fatal of diseases, the end of which no man can foretell or its results foresee.

PACIFIC COAST WEATHER SUMMARY.

During the month of July the weather in the Pacific Coast States has not been characterized by unusual conditions. The rainfall has been below the normal at all stations except San Francisco, where the increase amounts to .02 of an inch. The deficiency

ranged from "trace," at Red Bluff and Los Angeles, Cal., to .74 of an inch at Spokane Falls, Washington. No rainfall was reported from Southern California during the month. Rain fell on five days at Yuma, but in amounts too small to measure. In Northern California rain fell at San Francisco on the 8th, Eureka on the 8th and 20th, and amounts too small to measure at Keeler on the 20th and 21st. In Oregon the rainfall was confined to the northern portion of the State, and in Washington to the southern and extreme eastern portions. The heaviest monthly rainfall for July (1.64 inches) occurred at Fort Canby, Washington. The heaviest daily rainfall (.54 of an inch) occurred at Fort Canby on the 9th.

The temperature has been above the normal at all stations except Red Bluff, Portland, and Olympia, where it has remained stationary. The increase has varied from about 1° at Fort Canby and Spokane Falls to 9° at Los Angeles.

It is important to note, in connection with these remarks, that the reports from Signal Service stations furnish data from which general estimates of weather conditions are made. Therefore, this review, in its brief summarization of the events of the month, cannot take account of peculiar local effects. Reports from a greater number of stations would necessarily bring to light peculiar circumstances of rainfall and temperature, which are rather to be expected in a region so subject to local peculiarities as the Pacific Coast States.

Orndley, Dr. J. T. Harris	1,800
Hanford, Dr. J. A. Davidson	1,000
HHaywards, Dr. G. E. Alexander	1,200
Hedlandsburg, Dr. N. B. Coffman	4,000
Hollister, Dr. J. H. Tebbetts	2,000
Igo, Dr. H. Schafer	600
Jago, Dr. A. L. Adams	1,500
Jelton, Dr. J. S. McGowan	1,000
Jackson, Dr. E. B. Robertson	2,600
Zackeford, Dr. E. N. Foote	500
Livermore, Dr. E. M. Keys	1,800
Mineola, A. Fleming, H. O.	1,000
Lakeport, Dr. S. R. Mather	1,500
Long Beach, Dr. J. W. Wood	2,000
Los Gatos, Dr. F. W. Knowles	1,800
Lodi, Dr. P. W. Colman	1,200
Los Angeles, Dr. G. MacGowan	80,000
Marysville, Dr. D. Powell	4,000
Merced, Dr. K. S. O'Brien	2,000
Middletown, Dr. R. E. Hartley	500
Modesto, Dr. W. J. Wilhite	2,400
Martinez, Dr. J. B. Tennant	2,000
Mendocino, Dr. J. W. Milliken	3,000
Napa, Dr. M. B. Pond	6,000
National City, Dr. Theo. F. Johnson	2,000
Nevada City, Dr. F. R. Waggoner	6,000
Newman, Dr. H. V. Armistead	800
Needles, Dr. J. P. Booth	750
Oakdale, Dr. E. H. Endicott	1,000
Oakland, Dr. D. D. Crowley	60,000
Orland, Dr. W. Thurston	800
Orville, Dr. J. H. M. Karner	2,000
Ontario, Dr. W. E. Scott	2,000
Pasadena and vicinity, Dr. H. H. Sherk	10,000
Petaluma, Dr. L. H. Fatty	8,000
Placerville, Dr. W. Thurston	3,500
Pleasanton, Dr. W. H. Cope	700
Pomona and vicinity, Dr. S. F. Davis	3,600
Rio Vista, Dr. S. C. Brown	1,900
Reading, Dr. F. P. Mitchell	3,000
Rocklin, Dr. A. M. Stafford	800
Sacramento, Dr. H. L. Nichols	30,000
San Diego, Dr. D. Goehnauer	32,000
San Francisco, Dr. J. W. Keeney	330,000
San José, Dr. J. R. Curnow	25,000

ABSTRACT FOR JULY, 1890—Continued.

Other Causes	14	0	4	1	1	0	3	0	1	2	3	3	1	1	0	1	0	0	2	3	3	0	0	0	0	0	489
Alcoholism	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10	
Heart Diseases	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	75	
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cancer	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	
Cerebro - Spinal Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	12	
Remittent and Intermittent Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	10	
Typhoid Fever	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	32	
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Whooping-Cough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Croup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	
Other Diseases of St'mach & Bow'ls	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	78	
Cholera Infantum	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	
Diarrhoea and Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	
Congestion of the Lungs	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	
Acute Bronchitis	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	21	
Acute Pneumonia	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	50	
Consumption	0	0	1	2	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	
Total Deaths	18	3	6	5	5	4	14	4	4	1	0	1	0	0	0	3	1	1	3	4	0	2	7	0	1	1,132	
Estimated Population	12,000	5,400	7,500	5,500	450	8,000	10,000	15,000	2,500	1,000	850	500	1,300	5,000	2,900	3,000	6,000	4,000	3,000	2,500	900	600	4,000	850,440	1,132		
LOCATIONS AND AUTHORITIES.	San Mateo County, County Recorder.....	Santa Barbara, Dr. R. F. Winchester.....	Santa Cruz, Dr. C. L. Anderson.....	Santa Rosa, Dr. H. C. Crowder.....	Sausalito, Dr. H. J. Crumpton.....	San Benito County, Dr. J. H. Tebbetts.....	Shasta, Dr. J. M. Briceand.....	Sisson, Dr. E. C. Rhodes.....	Siskiyou County, County Recorder.....	Stockton, Dr. C. A. Ruggles.....	St. Helena, Dr. W. J. G. Dawson.....	Suisun, Dr. J. W. B. Reynolds.....	Susanville, Dr. A. Milliken.....	Tehachapi, Dr. A. Shafer.....	Truckee and vicinity, Dr. W. Curless.....	Trinity County, G. E. Gorman, H. O.....	Tulare City, Dr. C. F. Taggart.....	Ukiah, Dr. E. W. King.....	Vallejo, Dr. W. D. Anderson.....	Vacaville and Elmira, Dr. J. W. Stitt.....	Visalia, Dr. T. W. Pendergrass.....	Watsonville, Dr. W. D. Rodgers.....	Wheatland, Dr. L. Melton.....	Williams, Dr. A. W. Kimball.....	Woodland, Dr. T. Ross.....	Totals.....	

AUGUST, 1890.

Mortality reports received for the month of August from 96 different localities throughout the State, with an estimated population of 806,360, give the number of decedents as 1,065, a monthly percentage of 1.32 per 1,000, or an annual mortality at the rate of 15.84 per 1,000, which is somewhat less than that of the preceding month. The mortality from cholera infantum and stomach and bowel disorders continues without much abatement.

CONSUMPTION caused 157 deaths during the month, which is an increase over last report.

PNEUMONIA had only 41 deaths attributed to it, which is a decrease of 10 from last month. Twenty-eight of these occurred in San Francisco, 4 in Oakland, 3 in San José, the balance in single instances scattered here and there.

BRONCHITIS caused 29 deaths; of these 20 occurred in San Francisco, 3 in Los Angeles, 1 each in Vallejo, San José, San Bernardino, Sacramento, Oakland, and Fresno.

CONGESTION OF THE LUNGS was fatal in 11 instances.

WHOOPIING-COUGH caused 3 deaths.

DIPHTHERIA AND CROUP, collectively, caused 29 deaths, 25 being from diphtheria and 4 from croup. Of the former, 11 occurred in San Francisco, 2 in Los Angeles, 3 in Alameda, 4 in Sacramento, and 1 each in San José, Oakdale, Pasadena, Cloverdale, and Anaheim.

CHOLERA INFANTUM is reported to have caused 76 deaths in August, which is only 6 less than in the previous month.

DIARRHŒA AND DYSENTERY were fatal in 25 instances, which is a slight decrease from last report.

SCARLET FEVER was fatal in 2 instances, 1 in San Francisco and 1 in Antioch.

MEASLES caused but 1 death, which occurred in Hollister.

SMALLPOX caused no deaths.

TYPHO-MALARIAL FEVER is credited with 5 deaths.

TYPHOID FEVER.—Twenty-eight deaths were reported as caused by this disease, which is a decreased number from the previous month.

REMITTENT FEVER caused 6 deaths.

CEREBRO-SPINAL FEVER is credited with 10 deaths.

ERYSIPELAS caused no fatality during August.

CANCER was fatal in 40 instances.

HEART DISEASE is credited with 63 deaths.

ALCOHOLISM was fatal in 12 cases.

DEATHS FROM CAUSES not classified in this abstract number 451.

PREVAILING DISEASES.

Reports of sickness received from 110 localities throughout the State indicate a very favorable condition of the public health. If we except some bowel disorders that are a very general complaint, we might say that no sickness prevailed to any extent.

CHOLERA INFANTUM was increased in prevalence by the more than average high temperature experienced during the month. It was reported present in Sacramento, Redlands, Fresno, Pleasanton, Middletown, Gridley, Redding, Lockeford, Salinas, Brownsville, Cloverdale, Mariposa, Tulare, Dixon, Cottonwood, Forest Hill, Martinez, Alameda, Berkeley, Grass Valley, Gonzales, Haywards, Oakland, San José, Santa Cruz, Merced, Santa Rosa, Pomona, Orland, and San Francisco.

DIARRHŒA AND DYSENTERY were reported as noticed with increased frequency in Tehachapi, Pleasanton, Middletown, Santa Cruz, San Bernardino, Truckee, Redding, Galt, Hanford, Azusa, Lodi, Lockeford, Lakeport, Susanville, Brownsville, Benicia, Cloverdale, Newman, Williams, Ontario, Fresno, Forest Hill, Calico, Downey, Merced, Anaheim, Chico, Los Angeles, Rio Vista, Oakland, San Diego, Santa Rosa, and San Francisco.

CHOLERA MORBUS.—Some cases of this formidable disease were noticed in Middletown, Pleasanton, Eureka, Lakeport, Anaheim, Cottonwood, Cloverdale, Downey, Williams, Lockeford, Truckee, and Fresno.

MEASLES was reported as quite prevalent in Sacramento; it also was noticed in Pleasanton, Truckee, Dixon, Sausalito, Downey, and Hollister.

SCARLET FEVER.—Some sporadic cases of this disease were reported in Sacramento, Sausalito, Antioch, and San Francisco.

DIPHTHERIA AND CROUP were reported from Sacramento, Truckee, Rocklin, Newcastle, Oakdale, Anaheim, Etna Mills, Tulare, Cloverdale, Elk Grove, Los Angeles, Pasadena, San José, San Francisco, and Alameda. From the latter city Dr. J. T. McLean reports 18 cases, nearly all of whom were attending one of the public schools. He says: "An old cement sewer laid 12 years ago in the block in which this public school is situated, wore out and caved in, thus stopping the flow of sewage from the residences and school in this block. The old sewer was taken up and replaced by a new ironstone one. The process of change from the old to the new sewer occupied a fortnight. During this time sewer gas and disease germs escaped and contaminated the atmosphere in the neighborhood. The school children were more or less exposed, especially those whose curiosity drew them frequently and for a length of time to the vicinity of the sewer. The disease developing in these children, it is believed this broken sewer, with its escaping gas and disease germs, was the exciting cause of this sickness. In one family, where 3 children had diphtheria, 1 of them dying, the plumbing and sewerage were defective, the filth that should go into the sewer escaping into the cellar and contaminating the

atmosphere of the house, from which the sickness and death in this family resulted. Other cases of the disease are of a mild type."

WHOOPING-COUGH was noticed in Truckee, Sacramento, Rocklin, Lodi, Salinas, Etna Mills, Sausalito, and Merced.

ERYSIPELAS, in sporadic form, is mentioned in reports from Truckee, Eureka, Oakdale, Lodi, Anaheim, Mariposa, Susanville, Sausalito, St. Helena, Calico, and Fresno.

TYPHOID FEVER is reported in a very limited number of places in sporadic form, and no doubt arising from local preventable causes: Lockeford, Sacramento, Lodi, Forest Hill, Alturas, Brownsville, Healdsburg, Dixon, St. Helena, Merced, Angels Camp, San Bernardino, Antioch, Chico, Los Angeles, Oakland, San José, Fresno, Santa Ana, Santa Rosa, Stockton, and San Francisco.

TYPHO-MALARIAL FEVER was reported in Truckee, Redding, Galt, Hanford, Oakdale, Anaheim, Knights Ferry, Mariposa, Igo, Susanville, Cottonwood, Merced, Benicia, Yuba City, and Fresno.

REMITTENT FEVER is reported in Tehachapi, where, Dr. Shafer says, it is known as "mountain fever," and then often confounded with typhoid fever. The disease was also present in Anderson, Shasta, Truckee, Gridley, Redding, Newcastle, Needles, Cloverdale, Knights Ferry, Newman, Dixon, and Rocklin.

CEREBRAL FEVER was reported in a limited number of cases in St. Helena, Downey, Santa Cruz, San José, Fresno, San Diego, Galt, and San Francisco.

PNEUMONIA is seldom mentioned in the report for August. Sausalito, Healdsburg, Alameda, Antioch, Chico, Oakland, Petaluma, Sacramento, San Diego, San José, Fresno, and San Francisco report a few cases.

BRONCHITIS was reported in Brownsville, Benicia, Newman, Downey, Tehachapi, Pleasanton, Middletown, Eureka, Galt, Lockeford, Los Angeles, Oakland, Sacramento, Fresno, San José, Vallejo, and San Francisco.

The following is extracted from the Monthly Circular of the Connecticut State Board of Health, as full of interest to California at this season:

SUMMER DIARRHŒA.—A report pregnant with interest at this season of the year has lately been made to the local Government Board of England, relating to the causes of diarrhœa. The investigation of the subject covered a period of 8 years, from 1880 to December, 1888, and an extensive territory, including towns of high and low diarrhœal mortality. It studied carefully the following:

(1) *General Conditions* in their influence as etiological factors, to wit: Temperature of the air—Temperature of the earth to the depth of 4 feet—Rainfall—Air movement.

(2) *Conditions and Locality*, such as—Elevations above sea-level—Soil—Density of population—Impediments to ventilation—Dark and dirty dwellings—Sewer or cesspool emanations—Filthy accumulations of domestic refuse in privies, garbage heaps, etc.—Polluted drinking water.

(3) *Conditions relating to the Population*—As social position—Food and artificial feeding of infants—Maternal neglect and carelessness in infant management. The report gives as the result of this exhaustive study conclusions which the author modestly calls provisional hypothesis. While he accords to a high temperature a very potent influence, he says "it is exerted indirectly," and is not a direct cause of diarrhœa. The following remarkable statement appears in the report: "The summer rise of diarrhœal mortality does not begin until the mean temperature recorded at 4 feet below the earth's surface attains about 56° F., no matter what might have been the previous temperature of the atmosphere or that recorded by the 1-foot earth thermometer." And that the maximum diarrhœal mortality of the year is in the week in which the temperature recorded by the 4-foot earth thermometer attains its mean weekly maximum. And, further, that the decline of the diarrhœal mortality coincides with the decline of temperature recorded by the 4-foot earth thermometer without regard to the atmospheric temperature.

The effect of rainfall seems to depend upon its reducing the earth temperature.

Air Movement.—In diarrhœal season, calm promotes it and high winds lessen it.

Soil.—Diarrhœal mortality is favored by soils permeable to water and air. Rock and impermeable soils lessen it. The presence of organic matter in the soil favors a high diarrhœal mortality.

Density of Population, and everything which contributes to foul the air or interfere with its free circulation, enhances the diarrhœal death rate.

Domestic Darkness and General Dirtiness of Dwellings conduce to diarrhœal mortality; if with these the habitations are crowded and the ventilation bad, then the mortality is highest. *Sewer or cesspool emanations* in a concentrated form and suddenly let loose, the author says, are of themselves capable of occasioning a diarrhœal epidemic.

Food-keeping, exposed in cellars and closets to emanations from domestic filth will produce diarrhœa, especially if stored in dark places and not exposed to currents of air. He sums up the report with the following suggestions: That the essential cause of diarrhœa resides ordinarily in the superficial layers of the earth, where it is intimately associated with the life processes of some micro-organism not yet detected.

That the vital manifestations of such organism are dependent upon conditions of seasons, and on the presence of dead organic matter, which is its pabulum.

That in certain conditions, particularly of temperature, these organisms become volatile, and are wafted through the air, attaching themselves to such organic material as will afford them a nidus and pabulum.

That in food, both in and out of our bodies, such micro-organisms find the proper conditions for their development, multiplication, and evolution.

And that when so received into the human body, they are the material cause of epidemic diarrhoea.

That for obvious reasons bottle-fed babies are most exposed to this infection.

PACIFIC COAST WEATHER SUMMARY.

The month of August has been characterized by a general deficiency of rainfall and a general increase of temperature.

The rainfall has been decidedly above the average in southeastern California, southwestern Nevada, and southern Arizona, where destructive floods, high winds, and thunder storms have occurred. Precipitation has been below the normal at all Signal Service stations except Yuma, Keeler, Fresno, and Spokane Falls. The increase at these stations range from trace at Fresno to 1.61 inches at Keeler. The deficiency ranges from .02 of an inch at San Francisco to .54 of an inch at Portland. Rain fell on 3 days at San Diego, but in amounts too small to measure. The rainfall at Sacramento was a trace, which is the normal condition for the month. Red Bluff was the only station reporting no rain during the month. The heaviest rainfall, 1.71 inches, occurred at Keeler, and a trace at San Diego, Fresno, Sacramento, and San Francisco.

LOCAL STORMS.—On the 5th heavy rains and high winds occurred in southeastern California and southern Arizona. Redlands, California, 2.18 inches; Riverside, California, .55 of an inch; San Bernardino, rain for four hours with heavy thunder storm; Tucson, Arizona, over 60 miles of railroad track washed away. August 6th.—First rain of season in San Diego County; heavy in fruit districts and mountains. At Palmetto, Nevada, 8.60 inches reported as falling in 1 hour, and on the 11th 8.80 inches in about 2 hours, causing great damage to roads. August 10th.—Thunder storm at Topo, San Benito County, California. August 17th.—Thunder storm at Ashland, Oregon, and heavy showers at Shasta, Petaluma, Sonoma, and San Francisco. August 9th.—Los Angeles County, heavy rain, damage to hay and dried fruits.

The temperature has been above the normal at all Signal Service stations. The increase has ranged from 1° at Yuma, to 8° at Los Angeles and Walla Walla. The highest temperature, 110°, occurred at Yuma on the 17th. The lowest temperature, 36°, occurred at Baker City on the 31st.

1,900	Hanford, Dr. J. A. Davidson.....
1,200	Haywards, Dr. G. E. Alexander.....
4,000	Healdsburg, Dr. N. B. Coffman.....
2,000	Hollister, Dr. J. H. Tebbetts.....
800	Igo, Dr. H. Schafer.....
250	Knights Ferry, Dr. J. H. Lowe.....
500	Locketford, Dr. E. N. Foote.....
1,800	Livermore, Dr. E. M. Keys.....
500	Little Stony R. S. Burgett, J. P.....
1,000	Lincoln, A. C. Fleming, H. O.....
1,500	Lakeport, Dr. S. E. Mather.....
1,200	Lord, Dr. F. W. Colman.....
2,000	Long Beach, Dr. J. W. Wood.....
80,000	Los Angeles, Dr. G. MacGowan.....
4,000	Marysville, Dr. D. Powell.....
1,500	Merced, Dr. E. S. O'Brien.....
3,000	Mendocino, Dr. J. W. Milliken.....
2,400	Modesto, Dr. W. J. Wilhte.....
1,000	Mariposa, Dr. W. J. Kearney.....
500	Middletown, Dr. R. E. Hartley.....
2,000	Martinez, Dr. J. B. Tennant.....
6,000	Napa, Dr. M. B. Pond.....
4,000	Nevada City, Dr. F. R. Waggoner.....
800	Newman, Dr. Stratton.....
400	Newcastle, Dr. M. Schnabel.....
750	Needles, Dr. J. P. Booth.....
60,000	Oakland, Dr. D. D. Crowley.....
1,000	Oakdale, Dr. R. H. Endicott.....
2,000	Oreville, Dr. J. H. M. Karsner.....
3,000	Orland, Dr. W. Thurston.....
2,000	Ontario, Dr. W. E. Scott.....
10,000	Pasadena and vicinity, Dr. H. H. Sherk.....
8,000	Petaluma and vicinity, Dr. L. H. Patty.....
3,600	Placerville, Dr. H. W. A. Worthen.....
3,600	Pomona and vicinity, Dr. S. F. Davis.....
800	Pleasanton, Dr. W. H. Cope.....
8,000	Redding, Dr. F. P. Mitchell.....
1,800	Rio Vista, Dr. S. C. Brown.....
1,200	Rocklin and vicinity, Dr. A. M. Stafford.....
30,000	Sacramento, Dr. H. L. Nichols.....
2,700	Salinas City, Dr. M. C. E. Gydlson.....
15,000	San Bernardino Co., County Recorder.....
32,000	San Diego, Dr. D. Goehsauer.....
300,000	San Francisco, Dr. J. W. Keeney.....
15,000	San José, Dr. J. R. Curnow.....

ABSTRACT FOR AUGUST, 1890—Continued.

Other Causes	6	4	6	0	2	1	1	1	1	0	8	6	2	1	1	0	0	2	0	0	0	0	0	451
Alcoholism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	
Heart Diseases	0	1	2	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	63	
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cancer	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	40	
Cerebro - Spinal Fevers	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	
Remittent and Intermittent Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
Typhoid Fever	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	28	
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	
Whooping-Cough..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3	
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Croup	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	
Other Diseases of St'mach & Bow'ls	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	78	
Cholera Infantum ..	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76	
Diarrhoea and Dysentery	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	
Congestion of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	
Acute Bronchitis..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	
Acute Pneumonia ..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	
Consumption	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	157	
Total Deaths	6	7	8	0	0	0	6	1	0	0	12	8	5	1	0	2	0	0	0	0	0	0	1,065	
Estimated Population	12,000	15,000	5,400	1,000	7,500	1,800	5,500	150	1,000	15,000	2,800	850	600	1,900	5,000	3,000	6,000	600	800	4,000	803,360	Totals.....		
LOCATIONS AND AUTHORITIES.	San Mateo County, County Recorder..... Santa Ana and vic., Dr. J. G. Bailey..... Santa Barbara, Dr. R. F. Winchester..... Santa Maria, M. Thornberg, H. O..... Santa Cruz, Dr. C. L. Anderson..... Santa Paula, Dr. M. F. Patten..... Santa Rosa, Dr. H. Crowder..... Sausalito, Dr. H. J. Crumpton..... Sisson, Dr. E. C. Rhodes..... Stockton, Dr. C. A. Ruggles..... St. Helena, Dr. W. J. G. Dawson..... Susanville, Dr. A. Milliken..... Tehachapi, Dr. A. Shafer..... Truckee and vicinity, Dr. W. Curless..... Trinity County, G. E. Norman, H. O..... Tulare City, Dr. C. F. Taggart..... Vallejo, Dr. W. D. Anderson..... Wheatland, Dr. L. Melton..... Williams, Dr. A. W. Kimball..... Woodland, Dr. T. Ross.....																							

SEPTEMBER, 1890.

Mortality reports received from 85 different localities throughout the State, with an estimated population of 705,309, give the number of decedents as 920, being a monthly percentage of 1.3 per 1,000, or an annual mortality at the rate of 15.6 per 1,000, which is a considerable decrease from the previous month. The mortality from cholera infantum has in a marked measure decreased, as also have diseases of the respiratory organs.

CONSUMPTION caused 130 deaths in September, which is 27 less than last month.

PNEUMONIA was fatal in 54 instances, which is a slight increase over last report.

BRONCHITIS was credited with only 15 deaths, against 41 for the previous month, which is a decrease of 26 during the month.

CONGESTION OF THE LUNGS was fatal in 16 instances.

WHOOPING-COUGH caused but 2 deaths.

DIPHTHERIA AND CROUP, collectively, caused 30 deaths, which is about the same as last month. Nineteen were from diphtheria and 11 from croup. Of those from diphtheria, 8 occurred in San Francisco, 3 in Chico, 2 each in Los Angeles and Haywards, and 1 each in Watsonville, Pasadena, Modesto, and Marysville. From croup, 3 died in Sacramento, 5 in San Francisco, and 1 each in Pasadena, San José, and Grass Valley.

CHOLERA INFANTUM was credited with 45 deaths, which is a decrease of nearly one half the mortality recorded for August. The cooler weather during the month no doubt contributed not a little to this result.

DIARRHOEA AND DYSENTERY were fatal in 24 instances, which is also a decline.

SCARLET FEVER was fatal in but 1 instance, and that in San Francisco.

MEASLES caused but 1 death, which occurred in Los Angeles.

TYPHO-MALARIAL FEVER caused 1 death in Roseville.

TYPHOID FEVER was fatal in 30 cases, which is a small mortality.

REMITTENT FEVER caused 5 deaths.

CEREBRAL FEVER, which includes cerebro-spinal meningitis, is reported to have caused 10 deaths. Of these, 4 occurred in San Francisco, 1 each in Angels Camp, Fresno, Haywards, Pacific Grove, San Diego, and Watsonville.

ERYSIPELAS was fatal in 4 instances during the month; 1 each in Sacramento, San Francisco, San José, and Santa Cruz.

CANCER caused 29 deaths.

HEART DISEASE was fatal in 69 instances.

ALCOHOLISM is credited with 10 deaths during the month.

DEATHS FROM CAUSES not classified in this abstract, 401.

PREVAILING DISEASES.

Reports of sickness from 98 localities throughout the State continue to indicate a very favorable condition of the public health. It does not appear from any of them that epidemic disease of any description is present anywhere in the State. Bowel disorders are quite prevalent, as might be expected at this season, when fruit is indulged in without regard to quantity, and very often to quality. The cooler weather of the month past has had a beneficial effect in lessening the frequency and fatality of summer diarrhoea in children.

CHOLERA INFANTUM was noticed in sporadic form in Pasadena, Salinas, Chico, Gridley, Pleasanton, Knights Ferry, Ione, Lockeford, Mariposa, Angels Camp, Colton, Eureka, Marysville, Nevada City, Oakland, San Francisco, Sacramento, Pacific Grove, Roseville, San José, and Santa Ana.

DIARRHOEA AND DYSENTERY were reported in Azusa, Downey, Needles, Pacific Grove, Downieville, Lodi, Susanville, Brownsville, Lakeport, Chico, College City, Galt, Pleasanton, Hanford, Bakersfield, Fresno, Redding, Williams, Hollister, Julian, Modesto, Los Angeles, Oakland, Sacramento, and San Francisco.

MEASLES is evidently decreasing in the State. A few cases were noticed in Santa Cruz, Rocklin, Hollister, Los Angeles, San Francisco, and Sacramento.

SCARLET FEVER.—A limited number of cases were reported in Sacramento, Santa Cruz, Rocklin, Hollister, and San Francisco. The type is very mild, without any tendency to spread, although given every opportunity to do so. In Sacramento, it has come to our knowledge that children are permitted to attend school while the skin is still desquamating from the children's hands. As this is the most infectious stage, we are surprised at the limitation of the disease. This may be owing to the general good health of the school children, enabling them to resist the attack of the communicable germ; or it may be that the disease has but a weak effective power, and requires some unknown factor to give it that epidemic tendency which makes it one of the most dreadful of the communicable diseases.

DIPHTHERIA AND CROUP were present during the month in Truckee, Chico, San José, Hanford, Sacramento, Knights Ferry, Grass Valley, Haywards, Los Angeles, Marysville, Modesto, Pasadena, and San Francisco. In Chico, Dr. King writes, the disease was chiefly confined to one family, although five other cases appeared subsequently. Strict quarantine, however, prevented any extension of the disease. In Sacramento there was a serious outbreak of diphtheria and diphtheritic croup in the Protestant Orphan Asylum, which was, fortunately, confined to that institution; a few sporadic cases were, however, noted in the city. We cannot too earnestly impress upon the authorities that each case of such disease is a public danger, against which the public, as represented by its local sanitary authorities, is entitled to be warned by proper information, and we

believe that where an institution like the Orphan Asylum is the seat of epidemic contagious disease, it is the duty of the local Sanitary Officer to visit such institution, and have it properly disinfected under his personal supervision. Such disinfection should not be intrusted to those ignorant of the precautionary duties required, or left to the chance of a superficial sprinkling of carbolized water about the room as a sufficient remedy to destroy the germs of the disease. We believe that much of the diphtheria that exists is dependent upon insufficient disinfection where a case occurs. The germ, we know, is most tenacious of life, and except the most skilled disinfection is exercised, will continue to live and propagate its hateful existence for an indefinite period of time. We should therefore require all Health Officers to see to this matter themselves, and know that through their exertions all ordinary precautions have been taken to insure immunity to the public under their charge.

WHOOPING-COUGH was present in Sacramento, Salinas, Truckee, Anderson, and San Francisco.

ERTSIPELAS is mentioned in reports from Pacific Grove, Chico, Sacramento, Santa Cruz, San José, and San Francisco.

TYPHOID FEVER is reported with increasing frequency as the season advances. Sporadic cases occurred in Salinas, Downey, Needles, Lodi, Chico, Brownsville, Lakeport, Wheatland, Eureka, Igo, Alturas, Ione, Mariposa, Hollister, Stockton, Santa Ana, Santa Barbara, Los Angeles, San Francisco, Sacramento, Oakland, Grass Valley, and Nevada City. The increase in the prevalence of typhoid fever is to be expected at this season of the year, and will continue year after year until the public appreciate the fact that this is a PREVENTABLE disease, and wholly within its own power to eradicate. Its prevention simply requires perfect cleanliness about our persons and premises, and constant watchfulness of the sources of supply of our drinking water. All water from a suspected source should be boiled before using. Numerous instances are recorded where typhoid fever was spread from the rinsing of milk cans with water apparently pure, but really infected with the germs of typhoid fever capable of infecting the milk. We have no doubt that many of the cases of typhoid fever which have baffled our research for their origin have arisen in this way. Most of our dairies have their water supply from wells sunk in the cow yard, where they receive the drainage from the polluted soil. It is a matter of history that cattle themselves suffer from a disease analogous to typhoid fever, if not the identical disease itself. It would, therefore, be an act of prudence on the part of our Health Officers to visit our dairies and examine the source of their water supply, and the means used in keeping the milk from pollution. Milk from an unknown or a suspicious source should be heated to the boiling point before using, as thus is effectually destroyed not only the germs of typhoid fever, but likewise the germs of consumption, which are very commonly conveyed through milk taken from tuberculous cows.

CEREBRAL FEVER was reported in isolated cases in Pacific Grove, Sacramento, Redding, Angels Camp, Fresno, Haywards, San Diego, Watsonville, and San Francisco.

REMITTENT AND INTERMITTENT FEVERS were reported in a good many places, but the type was mild and occurred chiefly along the river bottoms and in the irrigated districts in preference to other localities.

PNEUMONIA is again becoming frequent in our reports. It was present in Salinas, Santa Cruz, Truckee, San Francisco, Sacramento, Chico, Eureka, Ione, Fresno, Folsom, Haywards, Sisson, Los Angeles, Monterey, Mendocino, Oakland, Petaluma, San Diego, and Gonzales.

BRONCHITIS was quite prevalent in many localities. It was noticed in Downey, Truckee, Needles, Brownsville, Chico, Galt, Pleasanton, Eureka, Bakersfield, Igo, Williams, Mariposa, and San Francisco. The type was mild, and the fatality quite limited.

PACIFIC COAST WEATHER SUMMARY.

The month of September has been characterized by a general increase of temperature, with an excess of rainfall in the south and a deficiency in the north.

RAINFALL.—It has been above the average in southeastern Oregon, California, western Nevada, and western Arizona, being especially marked in the Sacramento and San Joaquin Valleys. It has been below the average in western Oregon and Washington. The excess ranges from .09 of an inch at Los Angeles to 1.18 inches at Fresno. The deficiency ranges from .32 of an inch at Roseburg to 3.03 inches at Fort Canby. Rain fell on the following dates in Washington: 1st, 2d, 5th, 8th, 11th, 14th to 17th, 19th, 30th. Oregon: 1st, 16th, 19th, 23d, 26th, 29th, 30th. California: 4th, 5th, 15th, 16th, 18th, 19th, 22d to 30th. Nevada: 24th to 30th. Arizona: 1st, 3d to 8th, 10th, 15th to 19th, 23d, 24th, 28th, 30th. The following are the heaviest rainfalls for the month: Cisco, 3.13 inches; Colfax, 3.06 inches; Auburn, 2.77 inches; Red Bluff, 1.50 inches; Fresno, 1.30 inches. All stations have reported more or less rain during the month. The period of greatest rainfall was from the 27th to the 30th. It began in Southern California on the afternoon of the 27th, owing to the southwestward movement of a large area of cold air from Utah and Nevada, which had gradually moved southward from Montana on the 25th and 26th. This office issued rain forecasts for Southern California at 6 p. m. of the 25th, 48 hours in advance of the storm. Northern California also received rain forecasts equally far in advance of the storm. On the evening of the 27th, and also on the morning of the 28th, special rain warnings were telegraphed to all parts of California and portions of western Nevada. In spite of the general character of the rain and excessive amounts in certain localities, the damage to crops is reported to be comparatively small.

LOCAL STORMS.—Thunder storms occurred on the 2d at Spokane Falls; 5th, Susanville; 16th, Hollister; 23d, Phoenix; 24th, Fresno and San Miguel; 25th, Porterville. Hail storms occurred at Spokane Falls, 2d; Tombstone, 14th and 23d.

TEMPERATURE.—It has been above the normal at all Signal Service stations except Keeler, Fresno, Eureka, and Fort Canby, where the deficiency has ranged from 1° to 3°. The increase has ranged from 2° at Olympia to 8° at Walla Walla, and 9° at Los Angeles and Yuma. The highest temperature, 110°, occurred at Yuma, on the 3d and 4th. The lowest temperature, 24°, occurred at Baker City, on the 7th and 12th.

FROST.—It occurred at Baker City on the 1st, Newark and Winnemucca on the 2d, Baker City on the 3d, Drain, Or., on the 5th, Winnemucca on the 9th.

ABSTRACT FOR SEPTEMBER, 1890—Continued.

Other Causes	3	4	2	0	2	1	1	0	0	0	401
Alcoholism	0	0	0	0	0	0	0	0	0	0	10
Heart Diseases	1	0	0	0	1	0	0	0	0	0	69
Erysipelas	0	0	0	0	0	0	0	0	0	0	4
Cancer	1	0	0	0	0	0	0	0	0	0	29
Cerebro - Spinal Fevers	0	0	0	0	0	0	1	0	0	0	10
Remittent and Intermittent Fevers	0	0	0	0	0	0	0	0	0	0	5
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	30
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	1
Whooping-Cough ..	0	0	0	0	0	0	0	0	0	0	2
Smallpox	0	0	0	0	0	0	0	0	0	0	0
Measles	0	0	0	0	0	0	0	0	0	0	1
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	1
Croup	0	0	0	0	0	0	0	0	0	0	11
Diphtheria	0	0	0	0	0	0	1	0	0	0	19
Other Diseases of St'mach & Bow'ls	0	0	0	0	0	1	0	0	0	0	43
Cholera Infantum ..	0	0	0	0	0	0	1	0	0	1	45
Diarrhoea and Dysentery	0	0	0	0	0	0	0	0	0	0	24
Congestion of the Lungs	0	0	0	0	0	1	0	0	0	0	16
Acute Bronchitis ..	0	0	0	0	0	0	0	0	0	0	15
Acute Pneumonia ..	0	0	0	1	0	0	0	0	0	0	54
Consumption	2	0	0	0	1	1	0	0	0	0	130
Total Deaths	7	4	3	0	1	5	2	3	0	1	920
Estimated Population	2,800	850	1,300	5,000	6,000	4,500	2,500	900	800	4,000	705,309
LOCATIONS AND AUTHORITIES.	St. Helena and vic., Dr. W. J. G. Dawson.....	Susanville, Dr. A. Milliken.....	Truckee and vicinity, Dr. W. Curless.....	Trinity County, G. E. Norman, H. O.....	Vallejo, Dr. W. D. Anderson.....	Vacaville and Elmira, Dr. J. W. Stitt.....	Watsonville, Dr. W. D. Rodgers.....	Wheatland, Dr. L. Melton.....	Williams, Dr. A. W. Kimball.....	Woodland, Dr. T. Ross.....	Totals.....

OCTOBER, 1890.

Mortality reports received from 80 different localities throughout the State, with an estimated population of 754,639, give the number of decedents as 1,016, being a monthly percentage of 1.34+ per 1,000, or an annual mortality of 16.06 per 1,000, which is an increase over that of the previous month.

CONSUMPTION is credited with 150 deaths, which is an increase of 20 over the death rate in September.

PNEUMONIA caused 56 deaths, which is also an increase over last report.

BRONCHITIS was fatal in 20 instances.

CONGESTION OF THE LUNGS caused 7 deaths.

WHOOPIING-COUGH caused 4 deaths.

DIPHTHERIA is credited with 39 deaths, which is a large increase over the mortality caused by this disease last month. Twenty of these deaths occurred in San Francisco, where the disease is quite prevalent, 4 in Los Angeles, 3 in Alameda, 3 in Sacramento, 2 in Sausalito, and 1 each in San José, Visalia, Grass Valley, Fresno, Chico, Napa, and Newcastle.

GROUP caused 18 deaths, which is a large increase over the deaths from it last month. Thirteen died in San Francisco, 2 in Santa Ana, and 1 each in Stockton, San José, and Sacramento.

CHOLERA INFANTUM is credited with 32 deaths, which is a decrease from last report.

DIARRHOEA AND DYSENTERY were fatal in 13 instances.

SCARLET FEVER caused 1 death, which occurred in Oakland.

MEASLES was fatal in 2 instances, 1 in Sacramento, and 1 in Shasta.

TYPHO-MALARIAL FEVER, although quite prevalent, caused but 3 deaths.

TYPHOID FEVER is credited with 36 deaths, which is an increase over the number reported last month.

REMITTENT FEVER is credited with 5 deaths.

CEREBRO-SPINAL FEVER is reported to have caused 5 deaths.

ERYSIPELAS was fatal in 2 instances.

CANCER caused 29 deaths, which is about the monthly average.

HEART DISEASE caused 89 deaths.

ALCOHOLISM is credited with 15 deaths during the month.

DEATHS FROM CAUSES not classified in this abstract, 423.

PREVAILING DISEASES.

Reports received from 86 localities in different parts of the State indicate an increase of sickness in most of them, especially in those diseases affecting the respiratory system. This might have been expected, as these diseases are greatly influenced by the mean temperature. They increase in prevalence as the temperature falls, and diminish as it rises. During the month of October the temperature was generally higher than normal during the earlier part of the month, but later there was a rapid fall, in some places so marked as to produce frost. This change seemed at once to determine an increase of pneumonia, bronchitis, and a condition of pulmonary affection approximating very closely to "la grippe," without inducing the severe debilitating effect coincident with that disease. It was also observed that the change in temperature had given a temporary prevalence to bowel disorders in those persons whose excretory functions were particularly active and easily influenced by variations in temperature.

CHOLERA INFANTUM, which, at this season of the year, usually diminishes in frequency, was noticed as prevailing in many places. Sporadic cases occurred in Sacramento, Cloverdale, Gridley, Lodi, Redding, Middletown, Oakland, Haywards, Alameda, San José, San Francisco, Downey, Fresno, Berkeley, and Grass Valley.

DIARRHOEA AND DYSENTERY were reported in Hanford, El Monte, Hopland, Lodi, Redding, Eureka, Gridley, Visalia, Truckee, Galt, Sacramento, Hollister, Shasta, Downey, Fresno, College City, Chico, Los Angeles, San Diego, and San Francisco.

MEASLES is prevailing in some few places—Sacramento, Elk Grove, Igo, Monterey, and Rocklin.

SCARLET FEVER.—Sporadic cases of this disease were observed in Sacramento, San Francisco, Oakland, Hollister, Pacific Grove, and Truckee.

WHOOPIING-COUGH was reported in San Francisco, Oakland, Lockeford, Truckee, and Sacramento.

ERYSIPELAS.—Sporadic cases of this disease were reported in Truckee, Fresno, College City, and San Francisco.

TYPHOID FEVER.—The reports of this disease are increasing, the continued dryness of the weather being very favorable for its development. Sporadic cases were reported in Cloverdale, Cedarville, Napa, Lodi, Truckee, Galt, Igo, Elk Grove, Sequel, Nevada City, St. Helena, Oakland, Calico, Downey, Alameda, Oakland, San Francisco, San José, and Santa Ana.

TYPHO-MALARIAL FEVER was reported to be present in Hanford, Hopland, Cloverdale, Redding, Visalia, Cottonwood, Biggs, Hollister, Fresno, and College City.

REMITTENT AND INTERMITTENT FEVERS are not prevailing to any extent. Some few cases were observed in Gridley, Visalia, Knights Ferry, Redding, Truckee, Cottonwood, Fresno, Pacific Grove, Dixon, Anderson, Calico, Lockeford, Igo, Galt, and Marysville.

CEREBRAL FEVER was reported in isolated cases in Redding, Fresno, Grass Valley, and Pasadena.

PNEUMONIA was quite prevalent during the latter part of the month. It was so reported in San Francisco, Oakland, Alameda, Sacramento, Hanford, El Monte, Cottonwood, Lakeport, San José, St. Helena, Anderson, Gonzales, Fresno, Los Angeles, and Santa Barbara.

BRONCHITIS prevailed very generally, and was reported in College City, Fresno, Downey, St. Helena, Middletown, Lakeport, Lockeford, Galt, Visalia, Eureka, El Monte, Salinas, Los Angeles, and San Francisco.

INFLUENZA was mentioned in nearly all our reports as having been observed during the latter part of the month, some of our correspondents being of the opinion that it was a prelude to la grippe of last winter.

DIPHTHERIA AND CROUP have been quite prevalent during the month, assuming a malignity in many cases that has been quite unusual hitherto. In view of this prevalence, the State Board of Health has deemed it advisable to publish, for gratuitous distribution, a small pamphlet on the disease, its restriction and prevention, which can be had on application to the Secretary at Sacramento. The conditions being favorable for the development of the disease, the local health authorities should look more strictly to the public safety than they apparently do in the presence of these cases of diphtheria. They have the power of requiring from those persons attacked, that in regard to residence and otherwise, they shall so conduct themselves as not unnecessarily to multiply the chances of extending the affection to others. Public funerals should be strictly forbidden, and the transportation by rail of those dead from diphtheria should not be allowed, except under the most stringent provisions and competent inspection. Each case of such disease is a public danger against which the public is entitled to be warned by proper information. Any person knowingly having this disease under his care or control, who voluntarily neglects to take all the necessary precautions to prevent its spread, should not only be punishable by penalty, as for an act of nuisance, but should be liable to pay pecuniary damages for whatever harm he may occasion to others. At this time it would be well for parents to keep a watchful eye upon the animals with which their children play, as it is a well-ascertained fact that dogs and cats are very frequent carriers of infection into a household. An instance occurred in this city where a pet cat contracted diphtheria from a sick child and conveyed it to a neighbor's child who unfortunately played with it just after it had left the infected home. Cats having diphtheria generally display it by a yellow discharge through the nose, a gummy secretion about the eyes, a hoarse voice, and a desire for quiet and seclusion. Dogs are not nearly so subject to diphtheria as cats, but are liable to carry the infection on their hair. A curious fact recently discovered by Dr. Klein, and confirmed by the Health Officers in London, is that cats suffering from diphtheria manifest the disease more frequently in inflammatory deposit in the lungs than elsewhere, and while in this condition they were capable of communicating the disease to children, as when it manifested itself in the throat and nose. In San Francisco the disease is reported as almost epidemic, and ascribed to emanations proceeding from filthy sewers. It was also quite prevalent in Sacramento, in the vicinity of the drainage canal; was reported in Visalia, Napa, Sausalito, Hopland, Lodi, Eureka, Truckee, San José, St. Helena, Los Angeles, Downey, Fresno, Newcastle, Grass Valley, Chico, and Alameda. The extension of this disease to so many parts of the State may, perhaps, be attributed to some condition in the atmosphere of which we are ignorant, but we do know that wherever the germ is deposited, it is nurtured in filth and developed where sanitation is deficient.

PACIFIC COAST WEATHER SUMMARY.

The most striking feature of the weather for the month of October has been the marked deficiency in rainfall throughout the Pacific Coast States. The cause of this decrease in precipitation is due to a falling off in the number of storms which have entered the North Pacific Coast from the Japan Current, and also, and more especially, to the fact that these storms have passed eastward at a higher latitude than in previous Octobers. In order to illustrate this very important fact, I have prepared a set of storm-track charts for October, 1889, and 1890. A glance at these charts will show the relation between the extreme southerly position of the storm paths in October, 1889, and the extraordinary rainfall of that month, and the relation between the extreme northerly position of the storm paths and the marked deficiency of rainfall for October, 1890. The amount and distribution of rainfall dependent upon the latitude of the storms from the Japan Current, is one of the most important features of Pacific Coast weather, and is worthy of the careful attention of the public.

RAINFALL.—Except in Arizona, the rainfall is everywhere deficient. The decrease varies from .20 of an inch at Baker City and Keeler to 2.95 inches at Eureka, and 2.13 inches at Olympia. The excess varies from .88 of an inch at Fort Grant to 1.58 inches at Yuma. Rain fell on the following dates in Washington: 1st to 8th, 11th to 24th; Oregon: 1st to 8th, 11th to 14th, 16th to 19th, 22d; California: 1st to 3d, 9th, 10th, 13th, 19th; Nevada: 1st, 2d, 9th to 11th, 14th; Arizona: 1st to 4th, 10th to 12th. The heaviest rainfalls in 24 hours were 1.50 inches at Yuma on the 4th, and 1.22 inches at Fort Canby on the 5th. The heaviest monthly rainfalls were Fort Canby 5.30 inches, Portland 2.80 inches, Olympia 2.60, and Yuma 1.70. The following stations reported no rainfall during the month: San Francisco, Sacramento, Red Bluff, Fresno, Los Angeles, San Diego. Snow was reported as follows on the mountains: California, 9th, 10th, 20th; Nevada, 9th, 10th; Washington, 16th.

STORMS.—Hail storm near Tucson, Arizona, 4th. Thunder storms: Arizona, 4th; California, 17th. High winds on the Oregon and Washington coast, 2d, 5th, 6th to 9th, 13th, 15th, 18th, 20th, 24th, 27th, 28th. The maximum wind velocity at Fort Canby varied from 36 miles per hour on the 6th to 72 miles per hour on the 18th. Crescent City, Cal., high wind and heavy sea on the 28th.

TEMPERATURE.—The temperature has been generally above the normal. The excess ranges from 1° at Olympia to 10° at Los Angeles. The deficiency ranges from 2° at Eureka to 4° at Baker City. It remains stationary at Fort Canby and Fresno. The highest temperature—88°—occurred at Los Angeles on the 21st and 27th. The lowest temperature—20°—occurred at Baker City on the 15th. Frost occurred on the following dates in California: 3d, 9th to 12th, 14th to 17th, 20th; Oregon: 3d, 7th, 9th to 11th, 15th, 17th, 21st, 30th, 31st; Washington: 3d, 4th, 9th to 11th; Nevada: almost daily; Arizona: 12th. Ice formed at Silverton, Or., 14th.

REPORT OF THE STATE BOARD OF HEALTH.

[illegible]

Included in the above, and reporting no deaths, are the following: Biggs (pop., 2,000), Dr. O. C. Hawkins; Callico (pop., 1,000), Dr. A. R. Rhea; Dixon (pop., 2,500), Dr. A. Trifton; Downsville (pop., 1,000), Elk Grove (pop., 600), Dr. J. H. McKee; Elsinore (pop., 1,200), Dr. T. S. Ellis; Forest Hill and vicinity (pop., 3,000), Dr. Paul Reed; Folsom (pop., 1,500), Dr. B. F. Bates; Lockeford (pop., 500), Dr. E. N. Foote; Long Beach (pop., 2,000), Dr. J. W. Wood; Orland (pop., 3,000), Dr. A. M. Stafford; Wheatland (pop., 700), Dr. F. Melton.

NOVEMBER, 1890.

Mortality reports received from 103 localities throughout the State, with an estimated population of 752,739, give the number of decedents as 1,133, being a monthly percentage of 1.55 per 1,000, or an annual mortality at the rate of 18.60 per 1,000, which is the largest death rate we have had for many months. This increase is not due to the prevalence of any particular epidemic, but rather to the increased area of country in which diphtheria, typhoid fever, and acute pulmonary diseases have been present. The mortality from pneumonia, for instance, just doubled that for October, and the deaths from diphtheria and croup were also largely in excess of the preceding month.

CONSUMPTION caused the death of 157 persons, which is an increase over last month.

PNEUMONIA was fatal in 110 instances, which is double the increase over last report.

BRONCHITIS caused 24 deaths.

CONGESTION OF THE LUNGS was fatal in 19 cases.

WHOPING-COUGH caused 2 deaths.

DIPHTHERIA is credited with 58 deaths, which is a largely increased mortality over last report. Thirty-seven of these deaths occurred in San Francisco, 4 in Alameda, 3 each in Los Angeles and Modesto, 2 in Napa, and 1 each in Bakersfield, Tulare, Visalia, Santa Rosa, Santa Paula, Sausalito, San José, Downey, and Lorin.

CROUP.—The mortality from this disease kept pace with diphtheria, 38 deaths being attributed to it, 23 occurring in San Francisco, 1 each in Calico, Colton, Downey, El Monte, Folsom, Healdsburg, Los Angeles, Santa Ana, San José, Woodland, and 4 in Santa Cruz. In each of these places diphtheria was also reported.

CHOLERA INFANTUM was reported as causing 27 deaths, which is a decreased number of deaths from last report.

DIARRHŒA AND DYSENTERY were fatal in 16 instances.

SCARLET FEVER caused 5 deaths; 2 in San Francisco, 2 in Woodland, and 1 in San Diego.

MEASLES caused no deaths.

SMALLPOX caused 1 death in San Francisco.

TYPHO-MALARIAL FEVER was fatal in 2 instances only.

TYPHOID FEVER caused 37 deaths, which is the same number as last month, when the disease began to be more frequently observed.

REMITTENT AND INTERMITTENT FEVERS were fatal in but 4 instances.

CEREBRO-SPINAL FEVER is credited with 8 deaths, which is a slight increase.

ERYSIPELAS caused 3 deaths.

CANCER was fatal in 37 instances, which is an increase over last report.

HEART DISEASES were fatal to 76 persons.

ALCOHOLISM caused 16 deaths.

DEATHS FROM CAUSES not classified in this abstract, 441.

PREVAILING DISEASES.

Reports from over 100 localities in different parts of the State indicate a general increase of sickness throughout. There does not appear to be any epidemic prevailing, if we except a decided frequency of throat affections, especially tonsillitis, membranous angina, and diphtheria. The frequency of diseases of the respiratory system is also noticed, and an apparent tendency to the reappearance of epidemic.

INFLUENZA, now familiarly known as "la grippe," is observed by most of our correspondents. The abnormally dry weather which prevailed during the past month seems to have had a deleterious effect upon the general health, and probably determined that frequency to malaise which everywhere is a subject of complaint.

CHOLERA INFANTUM, though usually in abeyance so late in the year, was observed with frequency in many places. It is noticed in reports from Wheatland, Gridley, Redding, Elsinore, Fresno, Visalia, Needles, Martinez, Oakland, Petaluma, San José, and San Francisco.

DIARRHŒA AND DYSENTERY were reported as observed, with some frequency, in Blacks, Santa Paula, Oakdale, Wheatland, Pleasanton, Gridley, Downey, Igo, Redding, Mariposa, Elsinore, San Pedro, Eureka, Shasta, Fresno, Visalia, Bakersfield, Needles, El Monte, Brownsville, Oakland, Mendocino, and San Francisco.

MEASLES.—Some few cases were reported in Sausalito, Pleasanton, San Francisco, and Sacramento.

SCARLET FEVER.—A few cases were reported in San Francisco, Sacramento, Sausalito, Newcastle, Pacific Grove, Santa Cruz, Fresno, College City, Woodland, San Diego, and El Monte. Dr. Manson writes that several cases appeared at Graniteville, in Nevada County, of a mild type.

DIPHTHERIA AND CROUP appear to have been almost universally prevalent, being observed in San José, Santa Rosa, Santa Cruz, Santa Ana, Blacks, Santa Paula, Sausalito, Lockeford, Lodi, Newcastle, Elk Grove, Downey, Sacramento, Folsom, Visalia, Downieville, College City, Middletown, Bakersfield, Truckee, Williams, Colton, Lorin, Los Angeles, Modesto, Merced, Calico, Rio Vista, Napa, Oakland, Alameda, and San Francisco. In San Francisco 255 cases were reported during the month. In Alameda, Dr. John T. McLean thinks the prevalence of the disease is, in the main, owing to the imperfect way quarantine is maintained, and the lack of proper isolation of those sick with the disease. In Anaheim, Dr. Bullard writes that he thinks the disease originated in the school-room of a modern school, where the sewer pipe, imperfectly laid, became obstructed and filled with most offensive matter. On having this removed, the prevalence of sore throat

abated. There is a form of sore throat prevailing, which was recognized in Santa Cruz by Dr. Anderson, which, although resembling in some respects diphtheria, is not that disease, being non-contagious, and accompanied by a marked ulceration of the tonsils, but without the characteristic odor of diphtheria. It is seldom fatal, but as it is a matter of difficulty to tell one from the other, the safer plan is to treat all such cases as diphtheria, and isolate them accordingly. In Stockton, Dr. C. A. Ruggles considers diphtheria as bad a disease in a community as smallpox, and, as Health Officer, treats them with the same sanitary precaution, insisting on isolation and strict quarantine. In this manner he has succeeded in literally "stamping out" the disease wherever it has appeared, thus preventing its extension from the place of its development.

WHOOPIING-COUGH was reported as still prevalent in Lockeford and Anderson.

ERYSIPELAS was reported in sporadic form in Newcastle, Gridley, Blacks, Alturas, Ontario, Fresno, Truckee, Brownsville, and Bakersfield.

TYPHOID FEVER was observed in a few instances in Newcastle, Wheatland, Downey, Igo, Redding, Fresno, Bakersfield, Truckee, Cloverdale, Calico, Chico, Grass Valley, Lodi, Los Angeles, Marysville, Oakland, Sacramento, San José, San Francisco, Santa Ana, Tulare, and Watsonville. The dryness of the soil, and consequent lowering of the ground water, does not seem to have had the developing effect upon this disease that Pettenkoffer's theory would lead us to expect, as the cases recorded were all due to local causes, which sanitary efforts might have prevented.

TYPHO-MALARIAL FEVER was present in Wheatland, Knights Ferry, San Pedro, Ontario, Visalia, College City, and Truckee.

REMITTENT FEVER is not prevailing to any extent. It was noted in reports from San Francisco, Oakdale, Wheatland, Redding, Benicia, Lockeford, Shasta, Fresno, Cottonwood, Bakersfield, Truckee, Cloverdale, Chico, and Dixon.

CEREBRAL FEVER.—This disease was reported in sporadic form in Berkeley, Los Angeles, Pacific Grove, San Francisco, Vallejo, Redding, San Pedro, and College City.

PNEUMONIA was quite prevalent everywhere. It was noted in reports from Oroville, San José, Stockton, Haywards, Sacramento, Knights Ferry, Pleasanton, Redding, Blacks, Chico, Anderson, Elsinore, Los Angeles, Visalia, Eureka, Lockeford, Glendora, St. Helena, Cloverdale, Alameda, Berkeley, Brownsville, Etna Mills, Grass Valley, Lincoln, Los Gatos, Oakland, and San Francisco. The disease in many cases was of that low form known as *typhoid pneumonia*, and was particularly fatal when attacking persons beyond the middle period of life. In aged persons its fatality was very marked.

BRONCHITIS was also very prevalent, and was reported by all our correspondents as noticed in their districts.

INFLUENZA was very generally noted in our reports, and many of our correspondents considered that la grippe was again prevailing in their districts. The present influenza, so far as noticed, has failed to develop the intense prostration so very characteristic of the genuine la grippe. It is, however, more than probable that this symptom will not be wanting if the disease continues to increase in intensity.

MUMPS was epidemic in Pleasanton.

VARICELLA was observed in Sacramento.

SMALLPOX, we regret to say, has again been imported into San Francisco, this time from Central America by sea. The disease is epidemic in Guatemala, and may have come from this source. Three cases developed in San Francisco during November, and two since then. This should admonish us of the necessity of insisting that our school children be vaccinated as the law contemplates. This precaution would place our children in a condition to resist an invasion of the disease and prevent any extensive epidemic, if such a disaster threatened us. Of the protective power of vaccination against smallpox, there can be no question. History has again and again proven it, and in the last report of the Health Officer in Ireland, he declares that there was not a single case of the disease reported there within the past year, for the reason that vaccination is compulsory, and every one is brought under the operation of the law.

PACIFIC COAST WEATHER SUMMARY.

The most remarkable feature of the weather for the month is the extraordinary deficiency of rainfall. It is a deficiency which affects the entire Pacific Slope from Mexico to British Columbia. The proximate cause for this deficiency is found in the high latitude of the easterly movement of cyclonic areas from the Pacific Ocean. In spite of the fact that there were a large number of these areas, only one of them passed south of the northern boundary of the United States. This area gave rise to a peculiar secondary cyclonic effect, which passed southward into Nevada, and gave rise to the sudden and rather heavy rains in western Arizona and southern California. This secondary area was forced southward by the rapid formation of a high barometer in Washington and Oregon. A weather record for San Francisco, embracing a period of 42 years, shows that never before within that time has the month of November been so deficient in rainfall. The smallest amounts previously recorded are .15 of an inch in 1862, .25 in 1876, and .26 in 1884. A chart with the storm tracks for November, 1884, shows but 3 cyclonic areas, 2 of which passed eastward north of Washington, and the 3d through the northern portion of that State. This slight deflection to the southward of one of those areas was sufficient to give California a few light showers. The cyclonic areas for November, 1890, have been peculiar, not only for their high latitude, but also for their rapidity of movement, which has tended to increase their number, that is unusually large for the month. The rapidity of movement also explains the large number of days on which light showers fell in Wash-

ington and Oregon (nearly two thirds of the month), and the small total of precipitation. The conditions for rainfall were no sooner formed than a change in the cyclonic circulation drove them away. It is not within the province of this review to discuss the question as to the cause of the extreme northerly movement of the cyclonic areas for this month.

RAINFALL.—It is everywhere deficient, and the amount of such deficiency varies from .08 of an inch at Keeler to 6.15 inches at Olympia. The deficiency increases in amount from south to north, and is especially remarkable north of the 38th parallel. Rain fell on the following dates in Washington: 5th, 11th, 13th, 14th, 17th, 18th, 22d to 24th, 26th to 28th. Oregon, 5th to 8th, 11th, 22d to 27th. California, 5th to 7th, 22d to 25th. Nevada, 6th to 9th. Arizona, 6th to 8th. The heaviest rainfalls in 24 hours were .88 of an inch at Fort Canby on the 8th, and .56 of an inch at San Diego on the 7th. A fall of 2.65 inches was reported from Globe, Arizona, on the 8th. The heaviest monthly rainfalls were .70 of an inch at San Diego and Olympia. The following stations report no rainfall: Walla Walla, Winnemucca, Red Bluff, Sacramento, and San Francisco. Snow is reported as follows: Washington, 6th, Whitman County; Oregon, 8th, Harney County; California, 5th, Plumas, Yuba, and Sierra Counties, 2 to 24 inches; 6th, Ventura County; Nevada, 6th and 8th; Arizona, 8th, on Pinal Mountains.

LOCAL STORMS.—Hail storm at Belotta, Cal., 8th. Thunder storm at Quincy, Cal., 5th. High "northers" occurred in California on the 11th and 12th, during the prevalence of an area of extremely high barometer in northern Nevada, Idaho, and Oregon. The barometer during this time was from .40 to .80 of an inch above the normal. In some places the wind was reported as reaching a velocity of over 60 miles per hour, causing damage to fences, trees, and roofs of buildings. Floods were reported from western Arizona on the 8th, causing high water in the Gila and Colorado Rivers.

TEMPERATURE.—It has been above the normal in all districts. The excess ranges from 3° at Olympia to 12° at Los Angeles. The highest temperature, 86°, occurred at Los Angeles on the 3d. The lowest, 10°, occurred at Winnemucca on the 18th.

Abstract of the Reports of Deaths and their Causes in California during November, 1890.

LOCATIONS AND AUTHORITIES.	1823	31	11	03	22	10	00	00	00	10	26	00	00	13	35	10	24	20	1
Other Causes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alcoholism	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heart Diseases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cancer	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerebro - Spinal Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remittent and Intermittent Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Whooping-Cough	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Croup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diphtheria	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Diseases of St'mach & Bow'ls	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera Infantum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diarrhoea and Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congestion of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acute Bronchitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acute Pneumonia	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Consumption	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Deaths	1	18	2	3	3	3	3	0	1	0	0	0	0	0	0	0	0	0	0
Estimated Population	2,250	11,250	2,000	2,000	1,500	1,600	950	3,200	2,800	4,000	1,000	600	1,600	1,500	2,500	1,200	4	1	1
Alturas, Dr. J. M. Forrest.....	2,250																		
Alameda, Dr. John T. McLean.....	11,250																		
Anaheim, Dr. J. H. Bullard.....	2,000																		
Antioch, Dr. W. S. George.....	2,000																		
Anderson, Dr. O. P. Paulding.....	1,500																		
Auburn, A. S. Waldo, H. O.....	1,600																		
Azusa and vicinity, Dr. J. H. Miller.....	950																		
Bakersfield (Oct. & Nov.), Dr. C. A. Rogers.....	3,200																		
Benicia, Dr. E. Gray.....	2,800																		
Berkeley, Dr. F. H. Payne.....	4,000																		
Blacks, Dr. F. M. Stratton.....	1,000																		
Brownsville, Dr. L. C. Crossman.....	600																		
Calico, Dr. A. R. Rhea.....	1,600																		
Cedarville, Dr. B. Woodbridge.....	1,500																		
Colton, Dr. M. F. Price.....	2,500																		
Cottonwood, Dr. J. O. Smith.....	1,200																		
College City, Dr. G. H. Gibbons.....	700																		
Cloverdale, Dr. R. S. Markell.....	1,700																		
Chico and vicinity, Dr. W. King.....	10,000																		
Davisville, Dr. W. E. Bates.....	800																		
Dixon, Dr. A. Trafton.....	2,500																		
Downeyville, Dr. A. Jump.....	1,000																		
Downey and vicinity, Dr. Q. J. Rowley.....	2,500																		
Etna Mills, Dr. E. W. Bathurst.....	750																		
Elk Grove, Dr. J. A. McKee.....	500																		
Eureka and vicinity, Dr. S. B. Foster.....	10,000																		
Elsinore, Dr. T. E. Ellis.....	1,200																		
El Monte, Dr. F. F. Cave.....	800																		
Forest Hill and vic., Dr. Paul Reudy.....	3,000																		
Fresno, Dr. T. M. Hayden.....	9,000																		
Folsom, Dr. B. F. Bates.....	1,500																		
Galt, Dr. A. Montague.....	2,000																		
Grass Valley and vic., Dr. W. C. Jones.....	6,000																		

ABSTRACT FOR NOVEMBER, 1890—Continued.

Other Causes	0	2	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	2	0	0	1	2	3	5	4	1	3	1	1	0	1	0	0	0	0	16	2	0
Alcoholism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Heart Diseases	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cancer	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cerebro - Spinal Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Remittent and Intermittent Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Whooping-Cough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Croup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other Diseases of St'mach & Bow'ls	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera Infantum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diarrhoea and Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Congestion of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acute Bronchitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acute Pneumonia	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Consumption	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Deaths	0	5	0	0	5	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Estimated Population	500	800	2,500	1,400	1,200	4,000	600	250	500	1,000	1,000	1,500	2,000	1,700	1,000	1,000	1,200	65,000	4,000	1,500	800	2,000	1,000	2,000	2,000	2,000	2,000	3,000	5,000	3,000	400	750	500	1,500	60,000	2,000	2,000	3,000	700	1,000	500	1,500	60,000	2,000	2,000		
LOCATIONS AND AUTHORITIES.	Gonzales, Dr. C. A. E. Hertel..... Georgetown and vic., L. D. Markes, H. O. Gridley, Dr. J. T. Harris..... Hanford, Dr. J. A. Davidson..... Haywards, Dr. G. E. Alexander..... Healdsburg, Dr. N. B. Coffman..... Igo, Dr. H. Schafer..... Knights Ferry, Dr. J. H. Lowe..... Lockeford, Dr. E. N. Foote..... Lincoln, Dr. C. Clark..... Lakeport, Dr. S. R. Mather..... Long Beach, Dr. J. W. Wood..... Los Gatos, Dr. F. W. Knowles..... Lorin, Dr. E. J. Ashmore..... Lodi, Dr. E. A. Burchard..... Los Angeles, Dr. G. MacGowan..... Marysville, Dr. D. Powell..... Merced, Dr. E. S. O'Brien..... Middletown, Dr. R. L. Hartley..... Modesto, Dr. W. J. Wilhite..... Mariposa, Dr. W. J. Kearney..... Monterey, Dr. H. W. Faulkner..... Martinez, Dr. J. B. Tennant..... Mendocino, Dr. J. W. Milliken..... Napa, Dr. M. B. Pond..... Nevada City, Dr. F. R. Waggoner..... Newcastle, Dr. M. Schnabel..... Needles, Dr. J. P. Booth..... North San Juan, Dr. G. S. Farley..... North Bloomfield, Dr. J. Manson..... Oakland, Dr. D. D. Crowley..... Oroville, Dr. J. H. M. Karsner..... Orland, Dr. W. Thurston.....																																														

[illegible]

DECEMBER, 1890.

Mortality reports received from 93 localities in different parts of the State, with an estimated population of 744,169, give the number of decedents as 1,196, being a monthly percentage of 1.67 per 1,000, or an annual mortality of 20.04, which is a higher death rate than that of the preceding month, and the largest death rate we have had since January of last year, when epidemic influenza gave us a like increased percentage of mortality. The increased death rate during December was owing to the increase and fatality of diseases of the respiratory organs, including diphtheria and croup.

CONSUMPTION caused the death of 169 persons, which is an exceptionally large mortality for the month.

PNEUMONIA was credited with 140 deaths, which is a large increase over the deaths in November, when the mortality was considered quite high from this disease.

BRONCHITIS caused 28 deaths, a slight increase over the preceding month.

CONGESTION OF THE LUNGS was reported fatal in 9 instances only.

WHOOPING-COUGH was fatal in but 1 instance.

DIPHTHERIA is credited with 63 deaths, which is an increased mortality over that of November. Thirty-three of these deaths occurred in San Francisco, 6 in Alameda, 9 in Los Angeles, 2 in El Monte, 2 in Oakland, 2 in College City, 2 in Santa Ana, and 1 each in Antioch, Downey, Modesto, Sacramento, Santa Cruz, Sausalito, and Stockton.

CROUP, so closely allied to diphtheria as to be almost synonymous with it, caused 35 deaths. Of these, 20 occurred in San Francisco, 2 each in Los Angeles, Sausalito, San José, Sacramento, College City, and 1 each in Folsom, Haywards, Pasadena, Stockton, and Woodland.

CHOLERA INFANTUM.—The mortality from this disease has decreased, 12 deaths only being attributed to it.

DIARRHOEA AND DYSENTERY were fatal in but 9 instances, which is also a decrease.

SCARLET FEVER caused but 2 deaths, 1 in Eureka and 1 in Sacramento.

MEASLES was fatal in 1 instance.

SMALLPOX caused 3 deaths, all in San Francisco.

TYPHO-MALARIAL FEVER was fatal in 5 instances.

TYPHOID FEVER is credited with 31 deaths, which is a slight decrease from the mortality from this cause last month.

REMITTENT AND INTERMITTENT FEVERS are reported to have caused 5 deaths.

CEREBRO-SPINAL FEVER is credited with 5 deaths.

ERYSIPELAS caused but 3 deaths.

CANCER was fatal in 34 instances.

HEART DISEASE caused 84 deaths.

ALCOHOLISM caused the large number of 28 deaths.

DEATHS FROM CAUSES not classified in this abstract, 478.

PREVAILING DISEASES.

Reports of sickness from 100 localities in different parts of the State indicate a continued increase of sickness. Inflammatory affections of the chest and bowels seem to be particularly prevalent. This is probably owing to the changes in temperature during the month of December, together with the severe storms, and, in many places, damp fogs that were quite trying to many persons.

INFLUENZA was quite prevalent throughout the State. The form is much milder than that of last December, and, as a rule, is less depressing and debilitating. It may, however, take on a severer form during the present month, and increase our mortality returns.

PNEUMONIA was quite prevalent during the month, and of a very fatal character. It was noticed in reports from Ione, Bakersfield, Alameda, Anaheim, Antioch, Azusa, Pleasanton, Salinas, Hollister, Mariposa, College City, Berkeley, Colton, Cottonwood, Chico, Millville, Etna Mills, El Monte, Alturas, Downey, Lakeport, Galt, Redding, Lockeford, Gridley, Downieville, Grass Valley, Haywards, Los Angeles, Modesto, Sacramento, San José, San Francisco, Santa Ana, Santa Rosa, Vallejo, Watsonville, Calico, St. Helena, Biggs, and Stockton. The sudden onset of this disease and the rapidity of its course, mark it as one requiring prompt medical treatment if we would save life. The commonest cause of its development is the transit of the heated body into a cold atmosphere, or, quite as common, is the chilled body introduced into a dry and heated air; in both cases a congestion of the lungs is induced, which may be only temporary, and pass away, or, in those susceptible to inflammatory diseases, may develop into a pneumonia which will speedily terminate life. The preventive measures are, never to go from a hot room into the cold air without the intervention of a woolen or silk muffler over the mouth and nose, through which the air may be warmed before entering the lungs. If we would take the commonest sanitary precautions in our adaptations to changes of temperature, we would escape many affections of our lungs which we now largely invite by gross carelessness and inattention to hygienic rules.

BRONCHITIS prevailed quite as extensively as pneumonia, but its type was not so severe. It was noted as observed in almost every report received, and, in some places, was almost epidemic in form.

WHOOPING-COUGH was noticed in San Francisco, North San Juan, Lincoln, Elk Grove, Sacramento, and Cloverdale. The type of this disease was mild, its persistence being the most notable feature of its presence.

DIPHTHERIA AND CROUP were quite prevalent, being noted in reports from San Francisco, Alameda, Sacramento, Salinas, Los Angeles, Antioch, College City, Lodi, Visalia, Eureka, Benicia, Etna Mills, Elk Grove, Downey, Sausalito, Truckee, Middletown, Pacific Grove, Anaheim, Williams, Lockeford, El Monte, Modesto, Oakland, Ontario, Santa Ana, San José, Stockton, Woodland, Folsom, and San Francisco.

SCARLET FEVER, in a mild form, was observed in Sacramento, Contra Costa County, Blacks, Eureka, Azusa, College City, Middletown, Galt, and San Francisco.

MEASLES was noted in San Francisco, Sacramento, Colton, Pleasanton, and Ontario.

SMALLPOX.—There were a few cases of smallpox in San Francisco during December. There is only one case now in the pesthouse, and he is convalescent. No further trouble is anticipated with the disease, except it is again imported and concealed. San Francisco is so well vaccinated that smallpox can make no headway among its inhabitants. If our vaccination law were enforced, the same might be said of the whole State.

ERYSIPELAS, in sporadic form, was noted in Sacramento, Concord, Salinas, Ontario, Lincoln, Hollister, Truckee, Etna Mills, Cottonwood, Oakdale, Brownsville, Alameda, and Grass Valley. The type was mild, with very limited mortality.

TYPHOID FEVER did not prevail to the extent we would expect at this season of the year. Sporadic cases were reported in Bakersfield, North San Juan, Salinas, Igo, Mariposa, Visalia, Etna Mills, Lakeport, Redding, Galt, Wheatland, Gridley, Alameda, Fresno, Lake, Los Angeles, Oakland, Orland, Redding, San José, Santa Ana, Santa Barbara, San Diego, Santa Paula, Vacaville, and San Francisco.

TYPHO-MALARIAL FEVER.—A limited number of cases of this disease were reported in College City, San Pedro, Truckee, Redding, Wheatland, Oakland, Fresno, and San Francisco.

REMITTENT AND INTERMITTENT FEVERS are not very prevalent at present. They were noted in reports from Ione, Bakersfield, Visalia, Truckee, Knights Ferry, Wheatland, Los Angeles, Marysville, and Fresno. As these fevers are more or less under the influence of meteorological conditions, we may expect the continuance of cold weather to lessen their prevalence in a marked manner.

CEREBRAL FEVER was reported in a few instances in North San Juan, San Pedro, Downey, Knights Ferry, Wheatland, Anaheim, Gridley, Rocklin, and San Francisco.

We desire this month to call the attention of every Health Officer to the necessity of having all premises containing or having contained cases of infectious disease, properly fumigated and disinfected under their supervision, and to discourage, or, if possible, forbid the holding of a public funeral in every case of scarlet fever or diphtheria. Day by day we are called upon to record cases of disease contracted in this way. A general law should be passed making it a penal offense to fail to notify the public, by some distinctive flag or notice, of the presence of communicative disease, and any one holding a public funeral, where the cause of death is infective, should be severely punished.

PACIFIC COAST WEATHER SUMMARY.

The month of December has been distinguished by the following important features: (1) The extreme southerly movement of the heavy storm of 2d to 5th. (2) Heavy and continuous fogs in Northern California, 7th to 30th. (3) The barometric trough from the Washington coast southeastward to central Nevada attending the storm of 29th and 30th. (4) Heavy storms at sea, off the Washington coast, on 3d, 4th, 14th, 17th, 18th, and 25th. (5) The heavy storm of the 25th, in northern Oregon and Washington, causing much destruction of property in various cities, especially Seattle. (6) Warm weather in southwestern California, 6th to 30th. (7) General deficiency in rainfall. (8) Frosts in Southern California and southern Arizona. (9) The large number of cyclonic areas passing eastward north of Washington. (10) The high barometer in Nevada, 8th to 28th. In connection with the development of fogs during the month, it is important to note that they prevailed during the period of high barometer in northern Nevada. This high pressure began immediately upon the disappearance of the heavy storm in the first week of the month, and was dissipated by the formation of the barometric trough on the 29th and 30th, which latter date marks the termination of the heavy fog period. Under the influence of this high pressure area in northern Nevada, cold northerly winds and fogs prevailed in Northern California, and warm northerly winds in Southern California, which condition illustrates the extreme heating effect of the desert regions of southeastern California upon the air which passes over them.

RAINFALL.—There has been a general deficiency of rainfall, except a slight excess in the San Joaquin Valley and in southern Arizona. Of the eleven cyclonic areas which appeared off Vancouver Island during the month, all passed eastward north of Washington except two, one of which reached southward into the extreme northern portion of California, and the other passed eastward across northern Washington. This high latitude of the eastern movement of the storm areas explains the deficiency in rainfall. The deficiency ranges from .18 of an inch at Keeler to 4.01 at Portland, and is most marked in Oregon. The deficiency in California varies from .43 of an inch at Los Angeles to 1.96 inches at San Francisco. The rainfall at San Francisco during a period of forty-two years has been less than the present amount (3.25 inches) during fourteen previous Decembers. The smallest amount in a period of forty-two years was a trace in 1876. The next smallest amount was .33 in 1874, and .58 in 1865 and 1878. The excess in southern Arizona is .12 of an inch at Yuma and .30 at Fort Grant. The excess in the San Joaquin Valley is 1.02 inches at Fresno. The heaviest rainfall in twenty-four hours was 2.74 inches on the 21st at Olympia, at which station, also, the heaviest monthly rainfall

(8.10 inches) occurred. Rain fell in Washington 1st to 6th, 10th to 15th, 17th to 25th, 28th to 31st; snow on 20th. Oregon, 1st to 4th, 6th, 10th to 25th, 29th to 31st; snow, 4th, 5th, 30th, 31st. California, 2d to 5th, 10th to 14th, 18th to 20th, 21st, 23d, 25th, 28th to 31st; snow, 2d to 5th, 18th, 19th, 30th, 31st. Nevada, 2d to 5th, 19th, 30th, 31st; snow, 2d to 5th, 8th, 13th, 19th, 20th, 30th, 31st. Arizona, 4th to 6th, 10th, 11th, 18th, 30th, 31st; snow, 5th.

LOCAL STORMS.—Thunder storms: Astoria, Oregon, 19th; Sacramento, 3d; Port Angeles, Washington, 20th; with snow, hail storms, Sacramento, 3d, Stockton, 30th. The highest wind velocity at Fort Canby was 52 miles southeast 2d, 52 southeast 14th, 60 south 18th, 56 southwest 19th, 64 southwest 21st, 44 south 23d, 48 southeast 10th. At San Francisco the maximum velocity was 43 miles southwest on 3d.

TEMPERATURE.—It has been generally above the normal, except in Northern California, where the deficiency ranges from 1° to 4°. The excess is most marked in Southern California, southern Arizona, and eastern Washington, where the amount ranges from 7° to 9°. The highest temperature, 82°, occurred at Los Angeles on the 26th. The lowest, 12°, occurred at Winnemucca on the 10th and 12th.

Roseville, Dr. Wm. Bolton	800
Sacramento, Dr. H. L. Nichols	90,000
Salinas City, Dr. May Gydison	2,700
San Diego, Dr. D. Goehenaer	16,000
San Francisco, Dr. J. W. Keney	300,000
San Jose, Dr. J. R. Curriow	25,000
San Pedro, Dr. R. W. Hill	1,500
Santa Ana and vicinity, Dr. J. G. Bailey	15,000
Santa Barbara, Dr. R. F. Winchester	5,949
Santa Paula, Dr. M. E. Patten	2,000
Santa Cruz and vic., Dr. C. L. Anderson	7,000
Santa Rosa, Dr. J. S. Sargent	5,500
Sausalito, Dr. H. J. Crumpton	1,500
Shasta, Dr. J. M. Eliceland	400
Stockton, Dr. C. A. Ruggles	15,000
St. Helena and vic., Dr. W. J. G. Dawson	2,500
Suisun, Dr. J. W. Reynolds	1,000
Soquel, Dr. H. O. Brink	400
Truckee and vicinity, Dr. W. Curtiss	1,300
Trinity County, G. E. Norman, H. O.	5,000
Valejo, Dr. W. D. Anderson	6,000
Vacaville and Emira, Dr. J. W. Stitt	4,500
Visalia, Dr. C. E. Bernhard	3,500
Watsonville, Dr. W. D. Rodgers	2,500
Wheatland, Dr. L. Melton	700
Williams, Dr. A. W. Kimball	600
Woodland, Dr. T. Ross	4,000
Totals	744,169

Totals

JANUARY, 1891.

Mortality reports received from 94 localities in different parts of the State, with an estimated population of 736,100, give the number of decedents as 1,213, being a monthly percentage of 1.64, or an annual mortality of 19.68, which is a fraction lower than the percentage of December, but still much larger than usual. The continued high mortality is attributable to the prevalence of diseases of the respiratory system, the advent of a fresh epidemic of la grippe, with the extensive diffusion of diphtheria and croup.

CONSUMPTION exemplifies the epidemic influence that prevails with the increased mortality of 193 deaths in January.

PNEUMONIA is credited with 138 deaths, about the same as reported in the previous month.

BRONCHITIS caused 47 deaths, which is nearly double that of December.

CONGESTION OF THE LUNGS was fatal in 19 instances.

WHOOPING-COUGH caused 3 deaths.

DIPHTHERIA was fatal in 65 instances; of these, 38 occurred in San Francisco, 4 in Los Angeles, 3 each in Sacramento, Alameda, Rio Vista, and Santa Cruz; 2 each in Visalia, San José, El Monte, and Napa; and 1 each in Anaheim, Merced, and Santa Ana.

CROUP also shows a mortality of 92, which is a decrease from the report in December of these deaths. Sixteen occurred in San Francisco, 2 in San Diego, 1 each in College City, Long Beach, Napa, and Santa Ana.

CHOLERA INFANTUM is credited with 4 deaths only.

DIARRHOEA AND DYSENTERY likewise caused but 4 deaths, which is a remarkably small mortality, considering the frequency of the disease.

SCARLET FEVER caused but 4 deaths, 2 of them in San Francisco, 1 in San Diego, and 1 in Colton.

MEASLES was fatal in but 1 instance, in San José.

TYPHO-MALARIAL FEVER is credited with but 2 deaths.

TYPHOID FEVER was reported as causing but 20 deaths, which is an exceedingly low mortality for this disease, considering its prevalence. The type is evidently of a mild character.

REMITTENT FEVER caused only 3 deaths.

CEREBRO-SPINAL FEVER is credited with 9 deaths, which is a slight increase over last month.

ERYSIPELAS caused 7 deaths, which is an increase over last report.

CANCER was fatal in 37 instances.

HEART DISEASE was credited with 98 deaths.

ALCOHOLISM caused 14 deaths.

DEATHS FROM CAUSES not classified in this abstract, 458.

PREVAILING DISEASES.

Reports received from 94 localities in different parts of the State indicate that sickness is still prevalent, although not more so than in December, if we except those diseases affecting the respiratory system. There is no doubt that inflammatory disease of the lungs prevails extensively throughout the State, and that another epidemic of la grippe is fast developing. The particular feature about epidemic influenza this winter is the great tendency it exhibits to pass from the air tubes into the air cells, thus constituting pneumonia, which in many cases it does so quietly that to an ordinary observer it is unnoticed until death steals upon its victim. As a matter of wise precaution all cases of la grippe should be brought under the notice of a reputable physician before they have advanced to a dangerous stage of the malady, as *latent pneumonia*, which can only be detected by a skilled practitioner, may be advancing. The absence of the usual rainfall in January, together with the cold nights and fogs, seemed to have some influence in determining the frequency of coughs and colds, of which most every one complained. Disorders of the alimentary canal were not so frequently reported as in December, and no zymotic disease prevailed in an epidemic form.

CHOLERA INFANTUM.—Sporadic cases of this disease were reported in Merced, Santa Ana, North San Juan, and Monterey. It is not at all prevalent.

DIARRHOEA AND DYSENTERY were observed with some frequency in Visalia, College City, Knights Ferry, Bakersfield, San Pedro, Brownsville, Needles, Elsinore, Gridley, Kelseyville, Fresno, El Monte, Downey, and San Diego.

SMALLPOX.—A single case was reported from Humboldt County, but no particulars were received as to its origin.

VARICELLA, OR CHICKENPOX, was reported in Mariposa and Sacramento.

MEASLES was prevalent during the month in Pleasanton, Williams, Lockeford, Vacaville, Fresno, Alturas, Downey, Merced, Santa Cruz, San José, and Sacramento.

SCARLET FEVER was reported in San Diego, Hollister, Sacramento, San Francisco, Colton, Oakdale, El Monte, Napa, Middletown, Santa Cruz, Pacific Grove, Dixon, College City, and Modesto. In San Diego Dr. T. L. Magee reports that the disease was very mild, and that among the 84 cases notified at the Health Office only one death occurred. In Dixon the disease was almost epidemic, but no fatality resulted from it.

DIPHTHERIA AND CROUP.—Sporadic cases of these diseases were observed in many localities—Visalia, Eureka, Truckee, Napa, Azusa, Santa Ana, Downey, Los Angeles, San Diego, College City, San Luis Obispo, Anaheim, Sacramento, San José, San Francisco, Fresno, Mariposa, Pacific Grove, Santa Cruz, Modesto, Merced, Lodi, El Monte,

and Alameda. The disease reported by the press in Antelope Valley consisted in a limited outbreak in one family, the mother and three children being seized with it. According to the report of Dr. Fife, the disease was exceptionally malignant, proving fatal to the three children, the mother recovering. The source of the disease was supposed to be a child living in Antelope that died suddenly of some throat trouble, the nature of which was not known. From this the lesson may be learned that the simplest sore throat requires attention, as what may seem to be quite innocent in its nature may give rise to the most malignant and fatal disease. At the International Medical Congress the question was asked, "How long can a diphtheritic patient furnish infectious excretions?" In reply to this it was stated that excretions were found infectious three weeks after apparent recovery, and pieces of membrane yielded cultures fourteen weeks after discharge from the throat. Children having had the disease should therefore be kept from school for at least four weeks after recovery, and every article of apparel worn by them should be thoroughly disinfected. All doubtful cases of throat disease should be treated as diphtheritic until the contrary is clearly shown; by this means a danger would be averted that under any course might be imminent.

WHOOPING-COUGH is abating; a few cases were observed in Sacramento.

ERYSIPELAS was reported in Sacramento, College City, Knights Ferry, Bakersfield, Etna Mills, Fresno, Downey, San Francisco, Dixon, and Modesto. The type was generally mild.

TYPHOID FEVER is not prevalent in any part of the State. Some sporadic cases were reported in San Francisco, Eureka, Bakersfield, Etna Mills, Igo, Lockeford, Santa Ana, Fresno, Sacramento, Merced, Calico, El Monte, and Cedarville. The type is mild so far as heard from.

TYPHO-MALARIAL FEVER was reported in Visalia, College City, Knights Ferry, Redding, Oakdale, San Pedro, Cottonwood, Galt, Gridley, Merced, and Wheatland.

CEREBRAL FEVER.—Sporadic cases of this disease were observed in Redding and Napa.

PNEUMONIA was reported as present in Eureka, Pleasanton, Biggs, Bakersfield, Igo, Etna Mills, Truckee, Benicia, Redding, Brownsville, Lockeford, San José, Galt, College City, Anderson, Watsonville, Gridley, San Luis Obispo, Anaheim, Fresno, Alturas, Shasta, Dixon, Wheatland, Merced, San Francisco, Alameda, Oakland, and Sacramento.

BRONCHITIS was prevailing to a greater or less extent in every precinct heard from.

INFLUENZA appears in almost every report. In some places it is quite epidemic, and partakes of all the characteristics of la grippe, being attended by debility and great prostration. In many cases it is preliminary to a low form of pneumonia, which is said to be particularly fatal, owing to the depressing influences of the accompanying influenza.

PACIFIC COAST WEATHER SUMMARY.

The month of January has been notable for the following important features: (1) The high latitude of the easterly movement of cyclonic areas. (2) Although the approximate paths of 8 cyclones have been charted for the month, in no case did the center of any storm reach southward into Washington. (3) The marked deficiency in precipitation throughout the Pacific Coast States. (4) General increase in temperature in all districts, especially in Washington. (5) The periods of fair weather in Washington and Oregon from the 7th to the 14th, and from the 19th to the 23d, when this region was occupied by an anti-cyclone. (6) The slow movement of the cyclonic areas of the month, especially the storm of the 14th to 19th, which required nearly 5 days to pass eastward beyond Washington. (7) The period of high northerly winds in California from the 25th to 30th, when the velocities ranged from 25 to over 40 miles per hour at many places. During this time an anti-cyclone was central on the northwest coast of California and the southwest coast of Oregon. (8) The peculiar development of the cyclone of the 29th to 31st. This storm appeared to remain almost stationary over British Columbia, but with a remarkable influence in diminishing barometric pressure to the southward, without apparently changing the location of its center. The barometer fell slowly but constantly for three days, from Mexico to British America, culminating on the night of the 31st in light rains, with snow in mountains in California, Nevada, Oregon, and Washington. (9) The development of a huge waterspout off the mouth of the Columbia River on the 5th in the southeast current of the cyclone then central off Vancouver's Island. This cyclone first appeared on December 31st last, and remained in the vicinity of Washington until January 6th. The waterspout was reported as of remarkable size and power, moving from southwest to northeast, attended by a loud, roaring noise. It seemed to possess the characteristics of a veritable tornado, and would undoubtedly have caused considerable destruction to property, and perhaps life, if it had passed over the land. (10) The heavy and continuous gales off the Washington coast, especially from the 14th to the 19th, during which time the average daily maximum velocity at Fort Canby was nearly 50 miles per hour. (11) The heavy rains, turning to snow in mountains, in Southern California and southern Arizona on the 28th and 29th, resulting from the high northerly winds and low temperatures—San Diego 1.08 inches of rain and Fort Grant 3 inches of snow.

RAINFALL.—The rainfall has been deficient in all districts, especially in Northern California and western Oregon. The deficiency ranges from .25 of an inch at Keeler to 7.78 inches in Eureka, 4.57 inches at Red Bluff, and 4.08 inches at San Francisco. The rainfall at San Francisco has not been so small since 1852, when the amount reported was .58 of an inch. In 1851 the amount was .72 of an inch. The rainfall for January, 1891, is .98 of an inch. In January, 1892, there was recorded 24.36 inches—the heaviest rainfall ever

reported for San Francisco. The largest monthly rainfall was 6.60 inches, at Fort Canby. No rain fell at Keeler and Yuma. The heaviest rainfall in 24 hours was 1.08 inches at San Diego on the 28th and 29th. Rain fell on 22 days in Washington; in Oregon, 24 days of rain and 5 days of snow; in California, 19 days of rain and 13 of snow; Nevada, 10 days of rain and 17 days of snow; in Arizona, 4 days of rain and 4 days of snow. Local storms: Astoria, Oregon, 2d, thunder, lightning, and hail.

TEMPERATURE.—It has been above the normal in all the districts except northern Nevada, where the deficiency is only 1° at Winnemucca. The excess is most marked in Washington, northern Oregon, and southwestern California, where it ranges from 4° to 13°. The highest temperature, 80°, occurred at Los Angeles, 23d. The lowest, 18°, at Halleck and Carlin, Nevada, 10th.

Abstract of the Reports of Deaths and their Causes in California during January, 1891.

LOCATIONS AND AUTHORITIES.	Estimated Popula- tion	0 8 3 1 2 0 1 3 1 0 0 0 0 0 0 0 0 0 3 1 2 0 2 1 5 1 0 1 1 0 2 6 0 0																												
		Other Causes	Alcoholism	Heart Diseases	Erysipelas	Cancer	Cerebro - Spinal Fever	Remittent and In- termittent Fevers	Typhoid Fever	Typho - Malarial Fever	Whooping-Cough	Smallpox	Measles	Scarlet Fever	Croup	Diphtheria	Other Diseases of St'mach & Bow'ls	Cholera Infantum	Diarrhoea and Dys- entery	Congestion of the Lungs	Acute Bronchitis	Acute Pneumonia	Consumption	Total Deaths						
Alturas, Dr. J. M. Forrest.....	2,250																							2						
Alameda, Dr. John T. McLean.....	12,250																							10						
Antioch and vicinity, Dr. W. S. George.....	8,000																							4						
Anaheim, Dr. J. H. Bullard.....	2,000																							6						
Anderson, Dr. O. P. Paulding.....	1,500																							4						
Auburn, Dec. and Jan. A. F. Waldo, H. O.....	1,600																							4						
Azusa and vicinity, Dr. J. H. Miller.....	2,000																							3						
Bakersfield, Dr. C. A. Rogers.....	3,100																							7						
Bemica, Dr. E. Gray.....	2,900																							3						
Brownsville, Dr. L. C. Crossman.....	800																							2						
Biggs, Dr. O. C. Hawkins.....	2,000																							0						
Calico, Dr. A. R. Rhea.....	600																							0						
Cedarville, Dr. B. Woodbridge.....	1,500																							0						
Colton, Dr. M. F. Price.....	2,000																							2						
College City, Dr. C. H. Gibbons.....	700																							1						
Colfax, Dr. C. N. Miner.....	1,000																							0						
Cottonwood, Dr. J. O. Smith.....	1,250																							2						
Chico and vicinity, Dr. W. King.....	10,000																							11						
Dixon, Dr. A. Trakton.....	2,500																							3						
Downieville, Dr. A. Jump.....	1,000																							2						
Downey and vicinity, Dr. Q. J. Rowley.....	2,500																							3						
Elma Mills, Dr. L. W. Bathurst.....	750																							3						
Elk Grove, Dr. J. A. McKee.....	500																							1						
Eureka, Dr. S. B. Foster.....	10,000																							9						
Elsinore, Dr. T. E. Ellis.....	500																							1						
El Monte, Dr. F. P. Cave.....	800																							2						
Forest Hill and vicinity, Dr. Paul Reudy.....	3,000																							3						
Fresno, Dr. T. M. Hayden.....	10,000																							5						
Folsom, Dr. B. F. Bates.....	1,500																							1						
Galt, Dr. A. Montague.....	2,000*																							1						
Grass Valley, Dr. W. C. Jones.....	6,000																							10						
Gonzales, Dr. C. A. E. Hertel.....	500																							1						
Gridley, Dr. J. T. Harris.....	1,500																							1						

ABSTRACT FOR JANUARY, 1891.—Continued.

Other Causes	1	3	0	0	1	0	1	0	4	1	0	2	3	2	3	3	3	3	3	0	4	1	0	0	28	0	0	0	2	1	2	0	4	2	
Alcoholism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		
Heart Diseases	0	0	0	0	2	0	0	1	1	0	0	0	0	8	0	1	0	0	0	0	0	0	1	0	8	0	0	0	2	0	0	0	1		
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		
Cancer	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0		
Cerebro - Spinal Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	1	0	1		
Remittent and Intermittent Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
Typhoid Fever	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0		
Typho - Malarial Fever.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Whooping-Cough..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Croup	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	
Other Diseases of St'mach & Bow'ls	1	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Cholera Infantum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diarrhoea and Dysentery	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Congestion of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
Acute Bronchitis..	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	
Acute Pneumonia..	0	2	0	0	0	1	0	0	0	2	0	1	0	1	10	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0
Consumption	0	1	0	0	0	2	1	0	0	2	1	0	1	0	22	2	3	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	4	0
Total Deaths	2	5	4	0	5	6	2	1	0	8	1	0	1	0	86	8	2	3	0	0	0	0	0	0	72	8	2	1	5	2	0	3	10	9	
Estimated Population	1,500	1,200	4,000	1,500	600	1,800	250	500	1,000	7,000	2,000	1,200	500	60,000	5,000	2,500	1,000	500	5,000	5,000	700	500	60,000	1,000	2,000	3,500	10,000	8,000	1,200	1,900	3,000	5,000	6,000		
LOCATIONS AND AUTHORITIES.	Hamford, Dr. J. A. Davidson.....	Haywards, Dr. G. E. Alexander.....	Healdsburg, Dr. N. B. Coffman.....	Hollister, Dr. J. H. Tebbetts.....	Igo, Dr. H. Schafer.....	Ione and vicinity, Dr. A. L. Adams.....	Knights Ferry, Dr. J. H. Lowe.....	Lockeford, Dr. E. N. Foote.....	Lincoln, A. C. Fleming, H. O.....	Lake County, Dr. S. R. Mather.....	Long Beach, Dr. J. W. Wood.....	Lodi, Dr. E. A. Burchard.....	Lorin, Dr. E. J. Ashmore.....	Los Angeles, Dr. G. MacGowan.....	Marysville, Dr. D. Powell.....	Merced, Dr. E. S. O'Brien.....	Mariposa, Dr. W. J. Kearney.....	Middletown, Dr. R. E. Hartley.....	Monterey, Dr. O. S. Trimmer.....	Napa, Dr. M. B. Pond.....	Nevada City, Dr. F. R. Waggoner.....	Needles, Dr. J. P. Booth.....	North San Juan, Dr. G. S. Farley.....	Oakland, Dr. D. D. Crowley.....	Oakdale, Dr. R. H. Endicott.....	Oroville, Dr. J. H. M. Karsner.....	Orland, Dr. W. Thurston.....	Pasadena and vicinity, Dr. H. H. Sberk.....	Petaluma, Dr. L. H. Patty.....	Pleasanton, Dr. W. H. Cope.....	Rio Vista, Dr. S. C. Brown.....	Redding, Dr. F. P. Mitchell.....	Riverside, Dr. W. B. Sawyer.....		

FEBRUARY, 1891.

Mortality reports received from 85 localities in different parts of the State, with an estimated population of 721,991, give the number of decedents as 1,150, being a monthly percentage of 1.66, or an annual mortality of 19.92, which is a higher percentage than that of January, and shows a continued high death rate for California. This must be attributed to the great prevalence of diseases of the respiratory system, as with the exception of diphtheria, croup, and influenza, no infectious zymotic disease is prevailing.

CONSUMPTION caused 167 of these deaths, which is a decrease of 26 from the mortality of this disease in January.

PNEUMONIA increased its death rate from 138 deaths in January to 160 in February.

BRONCHITIS caused 44 deaths, which is also a high mortality from this disease.

CONGESTION OF THE LUNGS was credited with 18 deaths.

WHOOPING-COUGH was fatal in 4 instances.

DIPHTHERIA is credited with 61 deaths. Of these 38 occurred in San Francisco, 6 in Red Bluff, 4 in Napa, 2 each in Oakland, Los Angeles, Azusa, College City, and Hanford, and 1 each in Modesto, National City, and San José.

CROUP caused 26 deaths—23 in San Francisco, 1 each in El Monte, San José, and Sacramento.

CHOLERA INFANTUM was the cause of only 1 death, which is an evidence of its almost complete absence from the State.

DIARRHŒA AND DYSENTERY are likewise to be noted by their absence, 3 deaths only being recorded from them.

SCARLET FEVER, although quite prevalent in a mild form, caused no deaths.

MEASLES caused 4 deaths in Stockton.

SMALLPOX is absent from the State.

TYPHO-MALARIAL FEVER has only 2 deaths credited to it.

TYPHOID FEVER had the remarkably small mortality of 7 attributed to it. Six of these deaths occurred in San Francisco and 1 in Napa. The limited death rate from this disease may perhaps be attributed to the cleansing of foul sewers and filthy places by the copious rains which visited us during the month. In all events, it is worthy of note.

REMITTENT FEVER caused only 1 death.

CEREBRO-SPINAL FEVER is credited with 7 deaths.

ERYSIPELAS was fatal in but 2 instances.

CANCER caused 33 deaths.

HEART DISEASE was fatal in 100 cases.

ALCOHOLISM caused 9 deaths.

DEATHS FROM CAUSES not classified in this abstract, 445.

PREVAILING DISEASES.

Reports of sickness received from 96 localities in different parts of the State continue to indicate an abnormal amount of illness from those diseases affecting the respiratory system. The bowel disorders, which were so prominent a feature in previous reports, seem to have, in a great measure, subsided, being infrequently mentioned in our disease returns. Even cholera infantum remains unreported. The rainfall being copious during the month, had the salutary effect of flushing and washing the choked drains and sewers, carrying away much decomposing organic matter, the most prolific source of alimentary disorders. To it may be attributed the improved health of the community in its relation to bowel diseases, but how much the increased humidity has contributed to the prevalence of influenza and other diseases of the chest and lungs, it may be difficult to conjecture.

PNEUMONIA prevailed almost everywhere throughout the State. It was reported in some localities as partaking of an epidemic character, and in several instances appeared to be really infectious. One of our Health Officers reports an instance in which the father, mother, brother, and two sisters took the disease, one after the other, in the same house, both parents dying. It was noted in San Francisco, Oakland, Sacramento, Los Angeles, San José, Stockton, Marysville, Grass Valley, Downieville, Red Bluff, Etna Mills, Shasta, Modesto, Merced, San Diego, National City, Salinas, Kelseyville, Watsonville, Middletown, Redding, Truckee, Needles, Pleasanton, Alameda, Downey, Roseville, Hanford, Auburn, Anaheim, Benicia, Bakersfield, Jackson, and Fresno.

BRONCHITIS also prevailed to an alarming extent. The type, however, was not of a serious character, its universality being the most distinguishing feature of its presence.

WHOOPING-COUGH was reported in Sacramento, Elk Grove, Etna Mills, Truckee, Rocklin, Sausalito, San Francisco, Oakland, Salinas, Marysville, and Davisville.

DIPHTHERIA AND CROUP were also reported as present during the month in Sacramento, San Francisco, San José, Fresno, Napa, Modesto, Elk Grove, Hanford, College City, Azusa, Los Angeles, Red Bluff, El Monte, Truckee, Sausalito, Rio Vista, National City, and Merced. We believe that the spread of this disease might be materially lessened if the public could be taught to look upon it as it does upon smallpox, and take the same precautions in isolating its victims as it does those of the more loathsome disease, which, while disagreeable to wait upon, is not half so deadly in its results as the diphtheritic poison. Another point upon which it might be well to inform the public is, that where an infectious or contagious disease occurs in a home, and the washing of the patient's bedding or clothing is sent away to be washed without first having them thor-

oughly disinfected, and the washerwoman or any of her family thereby become infected, they can recover damages in a Court of law, if not previously notified or warned that the clothing is infected. A few successful suits of this kind would engender caution and a realization of the fact that public protection must be afforded against infectious disease.

SCARLET FEVER was quite prevalent during the month in many parts of the State. This is a disease that can be effectually quarantined against. Dr. M. F. Price, our Health Officer at Colton, writes: "The epidemic of scarlet fever with which we were threatened the first of the month was *effectually prevented* by strict isolation and quarantine. Only the first four cases occurred. The wisdom of the State and city health laws, with an officer empowered to enforce them, was fully demonstrated in this instance." Dr. T. L. Magee, Health Officer at San Diego, says: "Scarlet fever has almost entirely disappeared by strict isolation and quarantine of those affected." In the southern portion of Sacramento a public school had to be closed, the disease became so prevalent. In this disease, as in smallpox, the poison is given off from the bodies of the sick, and as we have no knowledge of any mode of protection corresponding with vaccination, the obvious means, therefore, of avoiding contagion, is to keep out of reach of the infection by the sick, or of articles infected by them. The difficulty of doing this can be estimated when we learn of the persistence of the vitality of the poison. It is communicable during the whole of the illness and convalescence of the patient. Infected clothing that has been packed away for months may communicate the disease and the instances are numerous where the infection has been carried long distances from the sick by healthy persons who have recently come in contact with scarlet fever. All these facts point to the most rigid exclusion of susceptible children from every possible source of infection.

MEASLES was epidemic in Stockton. Dr. C. A. Ruggles writes that in 20 years he does not remember hearing of so large a mortality in February. It was also noted in Davis, Sacramento, Alturas, Dixon, Lockeford, Redding, Williams, Sausalito, Downey, Benicia, Red Bluff, Fresno, and Cedarville.

ERTHIPPILAS.—Sporadic cases of this disease were noted in Modesto, Elk Grove, Anaheim, College City, Knights Ferry, Needles, Williams, Sausalito, Downey, Bakersfield, Salinas, Red Bluff, Fresno, and Newcastle.

TYPHOID FEVER is not prevalent in any portion of the State. San Francisco reports some, and sporadic cases were noted in National City, Etna Mills, Napa, El Monte, Redding, Vacaville, Bakersfield, Salinas, and Wheatland.

TYPHO-MALARIAL FEVER was reported in College City, National City, San Diego, Igo, Cottonwood, Bakersfield, Salinas, Wheatland, Fresno, Gonzales, Lodi, San Francisco, and Galt.

CEREBRAL FEVER.—Sporadic cases of this disease were noticed in North San Juan, Galt, Fresno, Grass Valley, San Diego, San Francisco, Watsonville, and Sacramento.

REMITTENT FEVER was present in Shasta, Lockeford, Knights Ferry, Lodi, Anderson, Truckee, Gridley, Red Bluff, Wheatland, and Oakland.

INFLUENZA, or **LA GRIFFE**, has, since the last report, developed into a widespread epidemic, equaling, if not exceeding, that which prevailed during the winter of 1889-90. That it spreads by atmospheric influence may be inferred from its rapid diffusion from place to place without any known intermediate intervention of contagion by external media. The present epidemic may be characterized by its sudden onset. The intensity of its initiatory symptoms, the premonitory chill, the fever, headache, backache, pains in the bones and muscles that more nearly resemble *dengue*, or backbone fever, than any other disease we can remember. Another feature peculiar to the present epidemic is the frequency with which cases occur in which the cough is almost entirely absent, and others in which pneumonia of a low type is almost certain to be developed. The debility accompanying the disease is invariably present, and must be treated by stimulants liberally given. The origin of the disease being unknown, the power of the sanitarian over it is exceedingly limited, and consists chiefly in advising the avoidance of all depressing influences that might deteriorate the healthy constitution or impair its strength.

PACIFIC COAST WEATHER SUMMARY.

The month of February has been distinguished by the following important features: (1) The southerly movement of three cyclonic areas which passed eastward through central Oregon, giving rise to the heavy rains, high winds, and high temperatures of the month in California and Nevada. (2) The violent cyclone of February 20th to 24th, which gave rise to remarkably high and destructive winds, heavy rains, and the lowest barometer readings for many years—Baker City, 28.94 inches; San Francisco, 29.10; Red Bluff, 29.02; Fresno, 29.32; Fort Canby, 29.06. (3) Seven cyclonic areas came within the limits of the Signal Service charts during the month, 4 of which passed eastward north of Washington. (4) The anti-cyclone of the 1st to 4th, which gave rise to a severe cold wave in Washington and Oregon, producing the lowest temperatures of the month—Baker City, Oregon, 12° below zero. This cold wave extended southward into Nevada and eastern California on the 4th—Halleck, Nevada, 14° below zero. (5) The anti-cyclone of 7th to 9th, which gave rise to the severe "norther" of the 8th in California; this anti-cyclone was attended by the lowest temperatures of the month in California and Nevada, and destructive winds in California, especially in the southern portion—Halleck, Nevada, 23° below zero on the 9th. Heavy sand storms and killing frosts, with the blowing down of some buildings, attended the "norther" in Southern California.

(6) The high southerly winds, high temperatures, and heavy rains of the 12th to 17th, 20th to 24th, and 26th to 28th, in Northern California and Nevada. (7) From the 9th, to the last day of the month the presence of a cyclonic disturbance was manifest without cessation off Vancouver Island.

RAINFALL.—The rainfall has been in excess of the normal in all districts except western Washington and northwestern Oregon. The long spell of drought was broken on the 14th, and in the last half of the month enough rain has fallen to carry the amount decidedly beyond the normal in southern Oregon, California, and Arizona. If this large precipitation could have been distributed over the month, much less damage would have resulted to property and greater benefits derived from the greatly needed moisture. The excess varies from .19 of an inch at Winnemucca to 4.84 inches at Los Angeles, 6.83 at Red Bluff, and 6.78 at Roseburg. The deficiency ranges from .19 of an inch at Fort Canby to 3.55 inches at Olympia. The rainfall at San Francisco has been exceeded in 6 other years during the past 40 years; the largest amount, 12.52 inches, occurred in February, 1878, and the next largest amount, 9.24 inches, in 1887. The largest monthly rainfall was 11.50 inches at Roseburg. The greatest in 24 hours was 3.80 inches at Red Bluff on the 14th. Rain fell on 23 days in Washington, on 26 days in Oregon, on 25 days in California, on 22 days in Nevada, and on 10 days in Arizona.

LOCAL STORMS.—Thunder storms, Eureka, 17th, Gilroy, 24th, Vacaville, 25th. Buildings struck by lightning, Shasta County, 18th. Hail, Eureka, 17th, San Francisco, 24th, Astoria, 6th, 19th, Shasta County, 18th. Winds of over 30 miles per hour have occurred on 2 days at Eureka, 5 days at Fort Canby, 6 days at San Francisco, Red Bluff, and Sacramento, and 14 days at Winnemucca.

TEMPERATURE.—It has been almost stationary in all districts, with a slight excess of 1° to 2° in northern Nevada, western Arizona, and southwestern California. The deficiency ranges from 4° at Keeler to 3° at Red Bluff and Olympia, and 1° at Eureka, Fort Canby, and Spokane Falls. The highest temperature, 74°, occurred at Yuma on the 7th and 14th. The lowest, 23° below zero, occurred at Halleck, Nevada, on the 9th, Baker City, 12° below, on the 2d.

Abstract of the Reports of Deaths and their Causes in California during February, 1891.

LOCATIONS AND AUTHORITIES.	Estimated Popu-lation	Total Deaths	Consumption.....	Acute Pneumonia.	Acute Bronchitis..	Congestion of the Lungs	Diarrhoea and Dys-entery	Cholera Infantum.	Other Diseases of St'mach & Bow'ls	Diphtheria.....	Croup.....	Scarlet Fever.....	Measles.....	Smallpox.....	Whooping-Cough.	Typho- Malarial Fever.....	Typhoid Fever....	Remittent and Inter-mittent Fevers	Cerebro - Spinal Fevers	Cancer.....	Erysipelas.....	Heart Diseases	Alcoholism.....	Other Causes.....
Alameda, Dr. John T. McLean.	11,250	14	1	2	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4
Anaheim, Dr. I. H. Bullard.....	2,000	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Anderson, Dr. O. P. Paulding.....	1,500	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Auburn, A. S. Waldo, H. O.....	1,600	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Azusa and vicinity, Dr. J. A. Miller.....	2,000	8	1	1	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Bakersfield, Dr. C. A. Rogers.....	3,100	6	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Benicia, Dr. E. Gray.....	2,900	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Berkeley, Dr. F. H. Payne.....	4,000	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
College City, Dr. C. H. Gibbons.....	700	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Colton, Dr. M. F. Price.....	2,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Concord, Dr. F. F. Neff.....	500	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Cottonwood, Dr. J. O. Smith.....	1,250	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Chico and vicinity, Dr. W. King.....	10,000	17	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Davisville, Dr. W. E. Bates.....	1,000	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Dixon, Dr. A. Truitt.....	2,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Downey and vicinity, Dr. Q. J. Rowley.....	2,500	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Etta Mills, Dr. L. W. Bathurst.....	750	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
El Monte, Dr. F. P. Cave.....	800	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Eureka, Dr. S. B. Foster.....	10,000	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Fresno, Dr. T. M. Hayden.....	10,000	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Grass Valley, Dr. W. C. Jones.....	6,000	7	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Gonzales, Dr. C. A. E. Hertel.....	500	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Gridley, Dr. J. T. Harris.....	1,500	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hanford, Dr. J. D. Davidson.....	1,500	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Haywards, Dr. G. E. Alexander.....	1,200	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Healdsburg, Dr. N. B. Coffman.....	4,000	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Igo, Dr. H. Schafer.....	800	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Jackson, Dr. E. B. Robertson.....	2,800	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Kings Ferry, Dr. J. H. Lowe.....	250	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Lockeford, Dr. E. N. Foote.....	500	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lake County, Dr. S. R. Mather.....	7,000	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Long Beach, Dr. J. W. Wood.....	7,000	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lodi, Dr. E. A. Burchard.....	1,200	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

REPORT OF THE STATE BOARD OF HEALTH.

ABSTRACT FOR FEBRUARY, 1891.—Continued.	
LOCATIONS AND AUTHORITIES.	
Los Angeles, Dr. G. MacGowan	65,000
Marysville, Dr. D. Powell	5,000
Modesto, Dr. W. J. Wilbite	2,400
Monterey, Dr. S. H. Smith	1,800
Napa, Dr. M. B. Pond	5,000
National City, Dr. J. W. Keene	1,200
Newcastle, Dr. M. Schnabel	400
Oakland, Dr. D. D. Crowley	60,000
Oakdale, Dr. R. H. Endicott	1,000
Oroville, Dr. J. H. M. Karner	2,000
Oriand, Dr. W. Thurston	3,500
Pasadena and vicinity, Dr. H. H. Sherk	8,000
Petaluma and vicinity, Dr. L. H. Patty	8,000
Pleasanton, Dr. W. H. Cope	800
Red Bluff and vicinity, Dr. J. M. West	5,000
Redding, Dr. F. P. Mitchell	3,000
Redwood City, County Recorder	2,000
Rocklin, Dr. A. M. Stafford	800
Roseville, Dr. W. W. Finney	600
Sacramento, Dr. H. L. Nichols	30,000
Salinas City, Dr. May Gydson	2,700
San Diego, Dr. T. L. Magee	16,000
San Francisco, Dr. J. W. Keeney	300,000
San José, Dr. J. R. Curnow	25,000
Santa Ana and vicinity, Dr. J. G. Bailey	15,000
Santa Barbara, Dr. E. F. Winchester	5,849
Santa Maria, Dr. M. Thornberg	1,000
Santa Cruz, Dr. C. L. Anderson	7,000
Santa Rosa, Dr. J. S. Sargent	5,500
Santa Monica, Dr. E. C. Folsom	1,500
Selma, Dr. E. E. Brown	1,800
Stockton, Dr. C. A. Ruggles	14,000
Suisun, Dr. J. W. B. Reynolds	1,000
Other Causes	23
Alcoholism	0
Heart Diseases	6
Erysipelas	0
Cancer	1
Cerebro-Spinal Fevers	0
Remittent and Intermittent Fevers	0
Typhoid Fever	0
Typho-Malarial Fever	0
Whooping-Cough	0
Smallpox	0
Measles	0
Scarlet Fever	0
Croup	0
Diphtheria	2
Other Diseases of Stomach & Bowels	5
Cholera Infantum	0
Diarrhoea and Dysentery	0
Congestion of the Lungs	3
Acute Bronchitis	0
Acute Pneumonia	17
Consumption	20
Total Deaths	80
Estimated Population	65,000

[illegible]

MARCH, 1891.

Reports of mortality received from 86 localities in different parts of the State, with an estimated population of 681,497, give the number of decedents as 1,251, being a monthly percentage of 1.83 per 1,000, or an annual mortality of 21.96, which is the largest death rate in any single month that has been recorded for years. This increase in the monthly percentage may be more apparent than real, owing to the correction of the estimated population in those towns and cities reported by the Census Bureau this month. When the population of all the towns is officially declared we will be able to get closer to the actual death rate in California than we are at present.

CONSUMPTION caused 188 deaths, which is above the average mortality from this cause.

PNEUMONIA was fatal in 168 instances, which is above the mortality in January or February, and the largest number yet reported in any single month.

BRONCHITIS caused 38 deaths, which is a slight decrease from the mortality in February.

CONGESTION OF THE LUNGS was credited with 21 deaths.

WHOOPING-COUGH, although quite prevalent, caused but 4 deaths.

DIPHTHERIA is reported to have caused 68 deaths. Of these 49 occurred in San Francisco, 2 each in Chico, Folsom, Modesto, Napa, Oakland, and Orland, and 1 each in Alameda, Berkeley, El Monte, Los Angeles, Pasadena, Pomona, and Visalia.

CROUP had a fatality of 20. Fourteen were reported from San Francisco, and 1 each from Azusa, Newcastle, Pasadena, Watsonville, San José, and Sacramento.

CHOLERA INFANTUM caused 3 deaths, which is conclusive evidence that the disease is not prevalent.

DIARRHŒA AND DYSENTERY were reported as causing 15 deaths, which is quite an increase over the preceding month, when 3 deaths only were recorded from these causes.

SCARLET FEVER, although quite prevalent in many places, is only credited with 3 deaths, which is reliable evidence of the mild character of the disease.

MEASLES is also reported as causing only 3 deaths, from which a like inference as to the type of the disease may be drawn.

TYPHO-MALARIAL FEVER caused no deaths.

TYPHOID FEVER was fatal in 15 instances, a slight increase over the mortality from it last month.

REMITTENT FEVER is credited with 4 deaths.

CEREBRAL FEVER.—Nine deaths were attributed to this disease.

ERYSIPELAS was fatal in 7 instances.

CANCER caused 33 deaths.

HEART DISEASE was fatal in 95 cases.

ALCOHOLISM caused 21 deaths.

DEATHS FROM CAUSES not classified in this abstract, 431.

PREVAILING DISEASES.

Reports of sickness received from 98 localities in different parts of the State show a tendency to abatement in all hitherto prevailing diseases. The lessened rainfall and the increased temperature during the month had a salutary influence in diminishing the prevalence of pulmonary diseases, although the frequency and fatality of pneumonia was exceptionally great for March. We find an increasing number of reports of diseases of the alimentary canal, although cholera infantum does not figure among them. Dysentery was quite noticeable in many localities, but of a mild type.

CHOLERA INFANTUM, where mentioned, was only reported in sporadic form.

DIARRHŒA AND DYSENTERY were reported of frequent occurrence in Bakersfield, Elinore, Fresno, Needles, Santa Paula, Hopland, Merced, Santa Rosa, College City, Sacramento, Visalia, Igo, Oakdale, Etna Mills, El Monte, Jackson, Los Angeles, Modesto, Marysville, San José, Eureka, and San Francisco.

VARICELLA, OR CHICKENPOX, reported in Sacramento and Mariposa.

MEASLES was reported as present in Sacramento, Redding, Vacaville, Lodi, Dixon, College City, Williams, Lockeford, Anaheim, Merced, Fresno, Sausalito, Alameda, Oakland, and San Francisco.

SCARLET FEVER in a mild form was observed in many places, among the number being Sacramento, Alturas, Stockton, Santa Cruz, Dixon, and San Francisco.

DIPHTHERIA AND CROUP still continue to be the scourge of young life, and claim as victims many of the healthiest children as well as the weakest. The direct cause remains still a mystery. After the most careful research, made by the local Government Board, in England, Dr. Buchanan, the Chief Medical Officer, says: "This disease has appeared to prevail under every variety of associated conditions. As usual, it has been accompanied, or its outbreak has been preceded by, abundant cases of apparently innocent sore throat. Neither has the approximate cause of diphtheria become any more apparent from the various bacteriological investigations that have been made," although all observers agree that the disease is owing to a bacillus, the identity of which is yet undiscovered. It is also agreed that its growth is favored in the presence of dampness and the absence of light, and that dryness, sunlight, and cleanliness are inimical to it. The view is also gaining ground that the disease is local before becoming general. If this conception is established it magnifies the importance of using disinfectant gargles and washes, and the absolute necessity of isolation, with strict cleanliness, accurate disinfection, with early and skilled treatment, if we would hope to limit or prevent the disease. Professor Löffler declares it as his opinion that the disease affecting pigeons, calves, pigs, turkeys, etc.

which resembles diphtheria, is not caused by the bacillus of human diphtheria, and that those diseases in the lower animals are therefore not to be feared as sources of the human affection. Klein, however, believes that etiologically they are the same, and should be looked upon as transmissible to man, and therefore it would be prudent to keep such animals away from the dwelling place during the prevalence of any such sickness.

WHOOPING-COUGH prevailed quite extensively in Sacramento, San Francisco, Oakland, Salinas, Downieville, Etna Mills, Middletown, and Alameda.

ERYSIPELAS was reported in sporadic form in Sacramento, Anderson, Brownsville, Bakersfield, Benicia, Santa Cruz, Downey, Mariposa, Merced, Etna Mills, Pleasanton, Fresno, Eureka, Modesto, Anaheim, and San Francisco.

TYPHOID FEVER.—A very few cases of this disease were reported as observed in Bakersfield, Merced, Etna Mills, Newcastle, San José, Sacramento, Los Angeles, and San Francisco.

TYPHO-MALARIAL FEVER was reported in Redding, Igo, Cottonwood, Merced, and Mariposa.

REMITTENT FEVER was observed in Redding, Needles, Lockeford, Knights Ferry, Fresno, and Visalia.

CEREBRAL FEVER.—Some isolated cases were reported in Sacramento, College City, Redding, Alameda, Gridley, Pomona, Watsonville, and San Diego.

PNEUMONIA was reported in every notice received, which exhibits its great prevalence. Following so large a proportion of cases of la grippe, it tends to show that there is some sort of connection between the two. Although the microphyte of pneumonia has apparently been identified, it is not yet placed beyond doubt, as if it were we must necessarily be obliged to place pneumonia among the communicable diseases. Several facts, however, contribute to this view, and even well-marked cases were noticed that seemed to be derived from others in close proximity.

BRONCHITIS prevailed extensively the past month throughout the State.

INFLUENZA, OR LA GRIPPE, continued in an epidemic form during the month. It is now on the wane, and probably by the next report issued it will have disappeared from the State. One of the most noticeable features of the epidemic was the predominance of the nervous symptoms. These were manifested by the violent headache, the pain down the spine, with oftentimes sensitiveness of the skin, making it painful to the touch, the mental depression, the tendency to faintness, which often preceded the attack, with the utter prostration following it, indicated the profound impression the poison exerted on the nerve centers.

THE STATE BOARD OF HEALTH.

The present Board having been superseded in office, with this issue of the "Monthly Circular" the connection of the present Secretary with it ceases. Hereafter his successor in office, when elected, will, it is to be hoped, improve and continue it for the information of the public and the instruction of those who are interested (as all should be) in the sanitary welfare of the State. Under the auspices of the deposed Board, sanitation in California was making a well-marked advance, and inducing a public interest in the matter which will yet bear fruit abundantly if it is sedulously cultivated. The Board has now had local Boards of Health organized and Health Officers appointed throughout the State; has enlisted a corps of sanitary correspondents who most diligently, and without monetary consideration, have kept the Secretary advised every month of the health of their different localities, and of the prevailing diseases existing, so that at any time the Secretary was in a position to take immediate action in the suppression of a threatened epidemic or the prevention of the advance of pestilential disease. The Board has also been successful in having Congress establish quarantine stations to protect our coast from imported disease. The one in San Francisco harbor, when completed, will be the most perfect in America, and will only be equaled by the one now in progress of erection in San Diego.

In taking leave of the public, the Board is desirous of acknowledging its obligation to the medical profession, the public press, and the railroads for the many favors extended to it, and would bespeak for its successors like courtesies from its many correspondents, upon whose kindness so much depends. Public health or sanitary efforts are not subjects to be controlled by or mixed with political prejudices or party strife. Sanitary science, being governed by natural law and not by politics, experience teaches us that neither disease nor death will be controlled by party dictation, or even arrested by party faith without sanitary works. Contagious diseases do not consult the political proclivities of their victims before invading the sanctity of their dwellings.

Abstract of the Reports of Deaths and their Causes in California during March, 1891.

LOCATIONS AND AUTHORITIES.	Alturas, Dr. J. M. Forrest.	*Alameda, Dr. John T. McLean.	Anderson, Dr. O. P. Paulding.	Auburn, A. S. Waldo, H. O.	Azus and vicinity, Dr. J. H. Miller.	Bakersfield, Dr. C. A. Rogers.	*Benicia, Dr. E. Gray.	Berkeley, Dr. F. H. Payne.	Brownsville, Dr. L. C. Crossman.	College City, Dr. H. Gibbons.	Cloverdale, Dr. R. S. Markell.	*Chico, Dr. W. King.	Dixon, Dr. A. Trafton.	Downeyville, Dr. A. Jump.	Downey and vicinity, Dr. Q. J. Rowley.	*Etna Mills, Dr. E. W. Bathurst.	*Eureka, Dr. S. B. Foster.	Elmore, Dr. T. E. Ellis.	El Monte, Dr. F. P. Cave.	Forest Hill and vicinity, Dr. Paul Reudy.	Fresno City, Dr. T. M. Hayden.	Folsom, Dr. B. F. Bates.	Grass Valley, Dr. W. C. Jones.	Gridley, Dr. J. T. Harris.	Haywards, Dr. G. E. Alexander.	Hopland, Dr. C. F. Grant.	Hollister, Dr. J. H. Tebbetts.	Igo, Dr. H. Schafer.	Jackson, Dr. E. B. Robertson.	Knights Ferry and vic., Dr. J. H. Lowe.	*Lockeford, Dr. E. N. Foots.	*Long Beach, Dr. J. W. Wood.	Lodi, Dr. A. E. Burchard.				
Other Causes	2	3	1	1	1	5	3	0	1	1	0	1	1	1	2	2	1	1	1	1	0	4	1	0	1	0	1	0	2	0	0	1	3	0	0	1	2
Alcoholism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Heart Diseases	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Cancer	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0		
Cerebro - Spinal Fevers	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		
Remittent and Intermittent Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0		
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Whooping-Cough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Measles	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Croup	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Diphtheria	0	1	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other Diseases of St'mach & Bow'ls	0	1	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
Cholera Infantum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Diarrhoea and Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0		
Congestion of the Lungs	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acute Bronchitis	0	0	1	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acute Pneumonia	0	4	0	0	0	0	2	1	0	1	0	1	0	0	1	0	0	0	0	0	1	0	3	0	2	1	0	3	0	0	0	1	0	1	0	2	
Consumption	0	2	0	0	2	1	0	0	0	1	0	4	0	0	0	0	6	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	
Total Deaths	2	13	3	1	5	7	3	4	2	3	3	16	2	1	3	9	1	1	4	8	10	2	5	2	6	1	1	3	3	5	1	1	1	1	1	6	
Estimated Population	2,250	11,165	1,000	2,000	2,000	3,200	2,360	4,000	800	700	1,500	2,894	2,500	1,000	2,500	500	4,858	1,200	800	5,000	10,818	1,500	6,000	2,500	1,200	600	1,500	800	2,600	1,250	500	2,000	2,000				

REPORT OF THE STATE BOARD OF HEALTH.

[illegible]

NOTE.—Population of towns marked with an asterisk are from official census, 1880. †Including towns reporting no deaths, of an aggregate population of 9,100.

APRIL, 1891.

RECOMMENDATIONS OF THE STATE BOARD OF HEALTH.

The State Board of Health, on the 10th of April, instructed the Secretary to announce to local Boards and correspondents generally that vague terms, such as heart failure, dropsy, colds, and childbirth, given in some monthly reports as causes of death, will be regarded as neither sufficient nor satisfactory; and to recommend that specific terms, having the sanction of usage, and recognized in medical nomenclature, be invariably used to designate the cause of death. The wisdom of such recommendation is obvious to intelligent minds. The objects to be attained are precision and accuracy.

The Secretary was also instructed to obtain the census of 1890 for all the cities and towns of importance in California, and to compute percentages of deaths from such corrected estimates of population. This number shows this to have been only partially done, but the next will show a full compliance with these instructions.

To Correspondents.—It is hoped that correspondents who have hitherto furnished reports to the State Board of Health will continue to do so.

It is not desirable to make changes unless the cause is imperative. Should, however, some be unable to continue this work, which is essentially in the cause of humanity, it would be well to send a notification to that effect, so that others may be secured. Such notification will admit of no delay. If, therefore, localities that have heretofore sent regular reports fail to send either a report for May, or a notification of inability to continue, it will be taken as an intimation that the Board will be at liberty to invite another correspondent.

It is extremely desirable that all reports should be forwarded at the earliest possible date after the end of each month. It is unnecessary to add that the members of the Board, and especially the Secretary, will appreciate fully the efforts of those who give their time and services to this cause. He desires their good will and support in the interest of sanitation in California.

REMARKS.

Mortality reports from 67 cities, towns, and localities, having a population of 674,830, show 1,064 deaths to have occurred from all causes. This is a percentage of 1.57 per 1,000 per month, or 18.84 per 1,000 per annum.

Consumption was the cause in 164 cases, pneumonia in 153, bronchitis in 40, and congestion of the lungs in 8. Diarrhoea and dysentery are assigned as the cause of 7 deaths, cholera infantum 3, and of other diseases of the stomach and bowels 51. Croup caused 21 deaths, scarlatina but 1, whooping-cough 3, typhoid fever 14, malarial fevers 3, cerebro-spinal fevers 6, cancer 29, erysipelas 1, heart disease 63, alcoholism 13, and all other causes, not necessarily classified, 436. Of this last number la grippe is responsible for 13 deaths, and there is a reasonable presumption that many fatal cases of lung disease are traceable directly to an attack of that disease. Diphtheria caused death in 48 cases, San Francisco furnishing 27. This disease is undoubtedly communicated by germ contagion or infection, but the principal influences contributing to its virulence and fatality are those unsanitary conditions arising from soil pollution, bad drainage, with resulting vitiated air and impure water. It follows, then, that efforts to reduce the numerical quantity and lessen the fatality of this disease should consist in the construction of good sewers and good drains, the removal of all offensive matter, the obliteration of stagnant water, and the annihilation of filth. Diarrhoea is given as the cause of 9 deaths. Localities having a large number of cases of la grippe show also an increase in diarrhoea; the city of Fresno, for example, reporting 33 cases of la grippe and 18 of diarrhoea. The general catarrhal condition of all the mucous surfaces in the former diseases is a sufficient explanation of the accompanying diarrhoea.

PREVAILING DISEASES.

MEASLES was reported from Middletown, Anderson, Downieville, Dixon, Etna Mills, San Pedro, Santa Paula, Truckee, Anaheim, College City, Red Bluff, Fresno, and Sacramento.

WHOOPIING-COUGH has been in Sacramento, Fresno, Vacaville, Downieville, and Oakdale.

LA GRIPPE.—The only disease that may be said to prevail extensively is la grippe, 363 cases being reported from different parts of the State, with an accredited fatality of 13. Fresno reported 33 cases, with 31 of bronchitis and 5 of pneumonia. Red Bluff 50, with 5 of bronchitis and 10 of pneumonia. Lincoln 10, with 1 of bronchitis. College City, 16, with 7 of bronchitis and 4 of pneumonia. Pleasanton 20, with 20 of bronchitis and 2 of pneumonia. Elsinore reported 15 cases, Alturas 13, Vacaville 10, with 8 of bronchitis and one of pneumonia. Eureka 5, with 10 of bronchitis and 2 of pneumonia. Anderson had 40 cases, Middletown 11, Oakdale 4, Calico 10, Knights Ferry 8, Gridley 10, Needles 20, National City 6, Etna Mills 15, Santa Paula 3, Benicia 6, and Truckee 60 cases. San Francisco, Los Angeles, San Diego, and other southern points of importance report none at all. Oakland, Alameda, and San José are almost, if not altogether, exempt. The progress of this remarkable malady has been somewhat erratic, following no well-defined course, and requiring no unusual local conditions for its development. It is unnecessary to predict its future in California. If the prevalence of moisture in some portions of the State during April is responsible for the extension of its visit, it would seem to follow that San Francisco, which had heavier rainfalls than for years before in April, should have had la grippe. Such, however, was not the case, none being

reported. The southern portion of the State has not been entirely exempt. Needles and Calico are in a region rated by the Signal Office as below normal in rainfall for April, but yet they have suffered severely from la grippe. In these instances moisture cannot have been the cause.

An abstract from the Signal Service report by Lieut. John P. Finley, U. S. A., for April, is appended, to give those who may be interested in following this subject an opportunity to estimate the value of rainfall and temperature in favoring or limiting the prevalence of this unique visitation:

The rainfall has been in excess of the normal in Northern California, western Oregon, and western Washington. Elsewhere there has been a deficiency. The excess varies from .05 of an inch at Sacramento to 3.31 inches at Eureka. The deficiency ranges from .04 of an inch at Los Angeles to 1.14 inches at Fresno. The heaviest monthly rainfall was 7.80 inches at Fort Canby, and the smallest .10 of an inch at Keeler. No rain fell at Yuma and Fort Grant, which fact marks an unusual deficiency for Arizona. The rainfall at San Francisco was 2.44 inches, or .40 of an inch above the normal. This is one of the heaviest rainfalls at San Francisco for a number of years during April. The other dates of heavy rainfall are as follows: 1853, 5.37; 1855, 5.00; 1860, 3.14; 1860, 10.06; 1884, 6.33; 1886, 5.28.

TEMPERATURE.—The temperature has been in excess of the normal in all districts, except the central portion of California, where the deficiency ranges from 3° at Keeler to 4° at Sacramento. It remained normal at San Francisco and Eureka. The excess ranges from 8° at Roseburg, and 6° at Yuma, to 1° at San Diego, Fort Canby, and Olympia. The highest temperature, 102°, occurred at Yuma on the 23th, and 100° on the 27th. The lowest temperature, 20°, occurred at Baker City, Oregon, on the 2d. Light frosts occurred in Northern California on the 8th, 11th, and 26th; in Oregon on the 2d, 3d, and 8th; in Nevada on the 11th, 19th, and 26th.

STATIONS.	RAINFALL.			TEMPERATURE.	
	April Rainfall.	Total Seasonal.	Normal April.	Average Monthly.	Normal April.
Red Bluff.....	2.30	20.51	2.18	58	56
Sacramento.....	2.00	15.00	1.95	52	53
San Francisco.....	2.44	16.22	2.04	53	53
Fresno.....	0.50	8.22	1.64	59	62
Keeler.....	0.10	4.36	0.64	57	60
Los Angeles.....	1.30	13.08	1.34	59	54
San Diego.....	0.80	10.02	0.90	58	57
Yuma.....	0.00	6.22	0.11	70	64
Fort Grant.....	0.00	17.86	0.60	59	-----

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Modesto, Dr. W. J. Wilhite.....	2,000	11	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mariposa, Dr. W. J. Kearney.....	1,000	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National City, Dr. J. W. Keene.....	1,200	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Napa, Dr. M. B. Pond.....	4,385	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Needles, Dr. J. P. Booth.....	750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oakdale, Dr. R. H. Endicott.....	1,000	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oakland.....	50,000	72	16	14	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pasadena and vicinity, Dr. H. H. Sherk.....	7,000	11	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petaluma, Dr. L. H. Patty.....	8,000	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasanton, Dr. W. H. Cope.....	800	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Bluff and vicinity, Dr. J. M. West.....	6,000	8	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redding and vicinity, Dr. F. P. Mitchell.....	3,000	8	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rio Vista, Dr. S. C. Brown.....	1,900	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sacramento, Dr. H. L. Nichols.....	30,000	46	5	5	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salinas City, Dr. May Gydison.....	2,900	3	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego, Dr. T. L. Magee.....	16,000	17	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Francisco, Dr. J. W. Keeney.....	300,000	562	83	80	28	8	2	1	37	27	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San José, Dr. J. R. Churnow.....	15,000	49	10	5	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Luis Obispo, County Recorder.....	3,000	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Pedro, Dr. E. W. Hill.....	1,500	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Ana and vicinity, Dr. J. G. Bailey.....	15,000	16	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Barbara, Dr. R. N. Winchester.....	5,864	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Monica, Dr. E. C. Folsom.....	1,500	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Cruz, Dr. C. L. Anderson.....	7,236	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Rosa, Dr. J. S. Sargent.....	5,500	14	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Paula and vic, Dr. D. W. Mott.....	3,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Selma and vicinity, Dr. E. E. Brown.....	2,000	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stockton, Dr. C. A. Ruggles.....	15,000	27	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Helena and vic, Dr. W. J. G. Dawson.....	2,500	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Truckee and vicinity, Dr. W. Curless.....	1,300	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vallejo, Dr. W. D. Anderson.....	6,000	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vacaville and Elmira, Dr. J. W. Stitt.....	4,500	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Visalia, C. D. Smith, Sec. Bd. of Health.....	2,985	6	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Williams, Dr. A. W. Kimball.....	600	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals.....	674,930	1,064	164	153	40	8	7	3	51	48	21	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals.....																										

MAY, 1891.

Reports from 66 cities, towns, and villages, having an aggregate population of 606,945, show a mortality of 945 from all causes. This is a percentage of 1.55 per 1,000 for May, or 18.60 per 1,000 per annum.

Consumption was fatal in 140 cases, being a reduction of 24 since April. Pneumonia was the cause of death in 91, bronchitis in 21, and congestion of the lungs in 11. There were 15 deaths from diarrhoea and dysentery, 8 from cholera infantum, and 34 from other diseases of the stomach and bowels. Diphtheria caused 33 deaths, croup 13, scarlatina 2, measles 3, and whooping-cough 8. Typho-malarial fever is credited with 3 deaths, typhoid fever with 20, remittent and intermittent fevers 7, and cerebro-spinal fever 3. Cancer caused 24, erysipelas 3, heart diseases 53, alcoholism 8, and all other causes 420.

PREVAILING DISEASES.

CHOLERA INFANTUM was reported at Fresno, San Pedro, Ione, Santa Paula, and Cottonwood.

DIARRHOEA has been quite prevalent, Willows reporting 12 cases, Modesto 111. It prevailed also at Ione, Etna Mills, Oakdale, Eureka, Lincoln, Bakersfield, Pleasanton, Santa Paula with 11, Vacaville, Middletown, San Pedro, Mariposa, College City, Red Bluff, and Fresno with 75 cases.

CHOLERA MORBUS was reported from Fresno, Modesto, Red Bluff, College City, Benicia, San Pedro, Pleasanton, Galt, Wheatland, and Williams.

DYSENTERY was reported from Williams, Ione, Downey, Gridley, Vacaville, San Pedro, Red Bluff, Modesto, and Fresno with 42 cases.

SMALLPOX has not been reported, but there is one case in the Sacramento City and County Pesthouse. It is believed to have been contracted at El Paso, Texas. Sufficient time has not elapsed to determine if the contagion is to spread. There are also cases of this disease at the United States Quarantine Station, near San Francisco, all of which are recovering.

MEASLES appears to be epidemic in Ione, 100 cases being reported. There were 10 at Red Bluff, 42 at Fresno, 11 at Wheatland, 20 at Oakdale, 18 at Bakersfield. It was also reported from Santa Paula, Truckee, Dixon, Vacaville, Mariposa, Lincoln, Etna Mills, Galt, and Sacramento.

SCARLATINA was reported from Ventura, Vacaville, Napa, Bakersfield, Oakdale, Ione, Modesto, and Sacramento.

DIPHTHERIA was reported from Modesto, St. Helena, Dixon, Truckee, College City, Eureka, and Napa.

FEVERS OF A MALARIAL TYPE have prevailed in Mariposa, Lincoln, Vacaville, Cottonwood, Sausalito, Pleasanton, Truckee, Gridley, San Pedro, Bakersfield, Ione, Red Bluff, Fresno, Wheatland, Oakdale, Etna Mills, Galt, and Williams.

TYPHOID FEVER has not prevailed to any great degree throughout the State. It is confined principally to the larger towns and cities.

DISEASES OF THE RESPIRATORY ORGANS coming under the head of pneumonia, bronchitis, and congestion of the lungs, have abated somewhat; but 133 deaths from these causes, exclusive of consumption, show that they prevail.

Three hundred and five cases of la grippe have been reported from 27 localities quite widely distributed.

San Francisco, Oakland, Los Angeles, San José, San Diego, Alameda, and Sacramento do not report prevailing diseases, the above reports being furnished from other sources.

The population is given according to the latest Census Report as published by Bancroft & Co., of San Francisco. It makes, in many instances, a material difference from former figures, but the discrepancy is explained when it is understood that many reports are taken from a wide area of territory covering many miles and attributed to one small town and vicinity. If, however, it is shown that any injustice is being done, a correction will at once be made.

Abstract of the Reports of Deaths and their Causes in California during May, 1891.

[illegible]

ABSTRACT FOR MAY, 1891—Continued.

LOCATIONS AND AUTHORITIES.	Other Causes	Alcoholism	Heart Diseases	Erysipelas	Cancer	Cerebro - Spinal Fevers	Remittent and Intermittent Fevers	Typhoid Fever	Typho - Malarial Fever	Whooping-Cough	Smallpox	Measles	Scarlet Fever	Croup	Diphtheria	Other Diseases of St'mach & Bow'ls	Cholera Infantum	Diarrhoea and Dysentery	Congestion of the Lungs	Acute Bronchitis	Acute Pneumonia	Consumption	Total Deaths	Estimated Population
Pasadena and vic., Dr. Henry H. Sherk.....	1	2	2	6	1	2	0	10															5	7,000
Petaluma and vicinity, Dr. L. H. Patty.....	0	0	0	0	0	0	0	0															3	8,000
Pleasanton, Dr. W. H. Cope.....	0	0	0	0	0	0	0	0															0	842
Red Bluff and vicinity, Dr. J. M. West.....	0	0	0	0	0	0	0	0															8	5,000
Redding, Dr. F. P. Mitchell.....	0	0	0	0	0	0	0	0															2	1,861
Rio Vista, Dr. S. C. Brown.....	0	0	0	0	0	0	0	0															2	1,900
Selma and vicinity, Dr. E. E. Brown.....	0	0	0	0	0	0	0	0															4	2,000
San Diego, Dr. Thos. L. Magee.....	0	0	0	0	0	0	0	0														20	16,150	
San Francisco, Dr. J. W. Keeney.....	0	0	0	0	0	0	0	0														79	297,990	
San José, Dr. J. R. Curnow.....	0	0	0	0	0	0	0	0														34	18,027	
San Luis Obispo, County Recorder.....	0	0	0	0	0	0	0	0														0	3,004	
Santa Paula and vic., Dr. D. W. Mott.....	0	0	0	0	0	0	0	0														0	3,000	
San Pedro, Dr. R. W. Hill.....	0	0	0	0	0	0	0	0														1	1,000	
Santa Monica, Dr. E. E. Folsom.....	0	0	0	0	0	0	0	0														0	1,700	
Santa Barbara, Dr. R. F. Winchester.....	0	0	0	0	0	0	0	0														6	5,864	
Santa Cruz, Dr. C. L. Anderson.....	0	0	0	0	0	0	0	0														7	5,594	
Santa Rosa, Dr. J. S. Sargent.....	0	0	0	0	0	0	0	0														6	5,216	
Suisun and vic., Dr. J. W. B. Reynolds.....	0	0	0	0	0	0	0	0														4	2,000	
St. Helena and vic., Dr. W. J. G. Dawson.....	0	0	0	0	0	0	0	0														4	2,800	
Truckee and vicinity, Dr. W. Curless.....	0	0	0	0	0	0	0	0														1	1,300	
Upper Lake, Dr. R. G. Reynolds.....	0	0	0	0	0	0	0	0														1	300	
Vallejo, Dr. W. D. Anderson.....	0	0	0	0	0	0	0	0														6	5,904	
Ventura and vic., Dr. N. J. Comstock.....	0	0	0	0	0	0	0	0														10	7,000	
Watsonville, Dr. W. D. Rodgers.....	0	0	0	0	0	0	0	0														1	2,153	
Wheatland and vicinity, Dr. S. Melton.....	0	0	0	0	0	0	0	0														1	600	
Williams, Dr. A. W. Kimball.....	0	0	0	0	0	0	0	0														0	500	
Totals	945	140	91	21	15	11	8	54	33	13	2	3	0	8	3	20	7	3	24	58	8	420	945	608,945*

* Including the following towns reporting no deaths: Cottonwood, Cloverdale, Downleville, Elsinore, Long Beach, Santa Maria, Vacaville, and Elmira.

JUNE, 1891.

Mortality reports from 75 cities, towns, and localities, aggregating a population of 675,964, show a total of 895 deaths from all causes. This is a percentage of 1.47 per 1,000 for June, or 17.64 per 1,000 per annum.

There were 140 deaths from consumption, 59 from pneumonia, 29 from bronchitis, 13 from congestion of the lungs, 18 from diarrhoea and dysentery, 24 from cholera infantum, 54 from other diseases of the stomach and bowels, 47 from diphtheria, 7 from croup, 7 from scarlatina, 2 from measles, 11 from whooping-cough, 1 from malarial fever, 23 from typhoid fever, 6 from cerebro-spinal fever, 32 from cancer, 1 from erysipelas, 78 from heart disease, 15 from alcoholism, and 428 from all other causes.

But few deaths have been reported as due to excessive heat, yet a sufficient number of cases of sunstroke have been noted during the few days of the heated term to dispel forever, it is hoped, the traditional fiction that insolation never occurs in California.

A reference to the mortality table will demonstrate an increase of deaths at San Francisco from diphtheria, there being 25 reported, as against 18 in May. It is remarkable that so much indifference should be shown to the ravages of a disease that is as surely preventable as smallpox. Every one will concede that 25 deaths from either cholera or smallpox would produce the utmost consternation in San Francisco. Nevertheless, 25 deaths from diphtheria, confined to those of tender years, seems to produce but little effect on those who have the control of ways and means with which to construct drains and sewers suitable to the urgent needs of a rich and populous city. Perhaps if these fatalities were confined to the voting class, a political thrill might find its tortuous way up the metropolitan spinal marrow, and for a time lead to the consideration of public morals in the way of municipal cleanliness. The same will apply to any other town or city.

PREVAILING DISEASES.

Reports of prevailing diseases from 47 localities show diseases of the stomach and bowels of a diarrhoeal character to have been quite common. There were 218 of simple diarrhoea, 27 of cholera infantum, 90 of cholera morbus, and 40 of dysentery. The fatalities have been light, considering the high temperature of the month. Thirty-three cases of measles, 33 of diphtheria, 3 of croup, 20 of erysipelas, 26 of typhoid fever, 275 of malarial fevers, 20 of pneumonia, 103 of bronchitis, 109 of la grippe, and 109 of whooping-cough, comprise the remainder. This would indicate that fevers of a malarial type were more prevalent than any other class of disease. This is easily explained by the late rains, creating surface water, followed by great heat. La grippe is diminishing, yet a considerable number of cases of bronchitis are attributable to this cause. The State, sanitarily considered, is in a healthy condition, and due vigilance should be observed in order to keep it so during the two months of warm weather before us.

JULY, 1891.

Mortality reports from 66 cities, towns, and villages, aggregating a population of 695,866, show 1,096 deaths from all causes. This is a percentage of 1.57 per 1,000 for July, or 18.84 per annum.

There were 141 due to consumption, 45 to pneumonia, 12 to bronchitis, 5 to congestion of the lungs, 16 to diarrhoea and dysentery, 82 to cholera infantum, 89 to other diseases of the stomach and bowels, 34 to diphtheria, 10 to croup, 5 to scarlatina, 7 to measles, 5 to whooping-cough, 5 to typho-malarial fevers, 38 to typhoid fever, 2 to remittent and intermittent fevers, 10 to cerebro-spinal fever, 45 to cancer, 80 to heart disease, 12 to alcoholism, and 473 to other causes.

There were 45 deaths from pneumonia as against 59 in June; 12 from bronchitis as against 29 in June; and 5 from congestion of the lungs as against 13 in June. This shows a marked decrease in acute diseases of the respiratory organs.

There were 38 deaths from typhoid fever, and 5 from typho-malarial fevers, as against 23 in June.

There were reported only 34 deaths from diphtheria as against 47 in June.

PREVAILING DISEASES.

Reports of diseases prevailing in 45 localities outside of cities and large towns show 39 cases of cholera infantum, 148 of diarrhoea, 42 of cholera morbus, 43 of dysentery, 43 of measles, 16 of scarlatina, 19 of diphtheria, 80 of whooping-cough, 25 of erysipelas, 26 of typhoid fever, 321 of malarial fevers, 5 of cerebral fevers, 3 of pneumonia, 45 of bronchitis, 7 of congestion of the lungs, 25 of influenza, and 7 of acute rheumatism.

Measles prevailed extensively at Middletown, Bakersfield, and Mariposa.

Red Bluff reported 25 cases of whooping-cough, and College City 18 cases.

Chico reported 14 cases of diphtheria.

Scarlatina has been reported from a number of places, always as in a mild form.

YELLOW FEVER.

The San Francisco "Chronicle" a few days ago published the following:

"*Yellow Fever at Guaymas.*—A letter received in this city by a business house, dated at Nogales, July 30th, states that the yellow fever prevails at Guaymas. There were 7 or 8 deaths a day during the week which preceded the writing of the letter. The informant adds that great efforts are being made to conceal the presence of the disease from the outside world, and that fines are threatened against any one in Guaymas who shall give information regarding the state of affairs."

A reply to a telegram to the "Chronicle" said: "Information authentic; it came in a letter to a merchant here, but we are not at liberty to give his name."

A telegram wired to Guaymas brought the following reply, dated August 7th: "No yellow fever at Guaymas or on the west coast of Mexico. A. Willard, U. S. Consul at Guaymas."

It is not improbable that the "Chronicle's" informant mistook dengue or some low form of malarial fever for yellow fever. It is scarcely probable that Consul Willard is mistaken; neither is it likely that the authorities influenced the telegraph companies to distort his message. Until further report is had to the contrary, it must be held that yellow fever does not prevail in Guaymas, and that we are not at this time in danger of invasion from that direction.

I believe it is generally admitted that a mean temperature above 70° F., with an abundance of moisture in the atmosphere, is necessary for the propagation of yellow fever.

There is some doubt about the hot valleys of the State possessing these conditions. It would not be wise, however, to permit the experiment, and the utmost vigilance will be observed during the remainder of the summer.

The health of the State is, generally speaking, very good; no epidemic prevails.

A preventive disease circular, entitled "Diphtheria; Its Restriction and Prevention," has been published by authority of the State Board of Health, and is intended for general distribution among the people. It will be sent, in numbers required, upon application to the Secretary of the Board at Sacramento.

ABSTRACT FOR JULY, 1891—Continued.

Other Causes	122211012246239264315331223518111122650200	475
Alcoholism	0000001000000500000000000000100101000000	12
Heart Diseases	01111000000010043410000000003120000000000	80
Erysipelas	000	0
Cancer	00100010000000000000000000000000000000000	45
Cerebro - Spinal Fevers	00000010000210200000000000000000000000000	10
Remittent and Intermittent Fevers	00000020000000000000000000000000000000000	2
Typhoid Fever	02000100000302000000000000000000000000000	38
Typho - Malarial Fever	00000000000000300000000000000000000000000	5
Whooping-Cough..	00000001000000002000000000000000000000000	5
Smallpox	000	0
Measles	000	7
Scarlet Fever	000	5
Croup	000	10
Diphtheria	000	34
Other Diseases of St'mach & Bow'ls	00110000000000000000000000000000000000000	80
Cholera Infantum	00001000000000000000000000000000000000000	62
Diarrhœa and Dysentery	00001000000000000000000000000000000000000	16
Congestion of the Lungs	000	5
Acute Bronchitis ..	000	12
Acute Pneumonia ..	00100000000000000000000000000000000000000	45
Consumption	03000000000000000000000000000000000000000	141
Total Deaths	186060208203469590521237001700117200573122030003001003300061	1,086
Estimated Population	20007000800050006000800019008002627216150330000180273004700017001090058642000556452161437610001300300010005804700045002500600	685,866
LOCATIONS AND AUTHORITIES.	Oroville, Dr. J. H. M. Karsner..... Pasadena and vic., Dr. Henry Sherck..... Petaluma and vicinity, Dr. L. H. Patty..... Pomona and vicinity, Dr. R. F. Rose..... Red Bluff and vicinity, Dr. J. M. West..... Redding and vicinity, Dr. F. P. Mitchell..... Rio Vista and vicinity, Dr. S. C. Brown..... Rocklin, Dr. A. M. Stafford..... Sacramento, Dr. C. B. Nichols..... San Diego, Dr. Thomas L. Magee..... San Francisco, Dr. J. W. Keeney..... San José, Dr. J. R. Curnow..... San Luis Obispo, County Recorder..... San Pedro, Dr. R. W. Hill..... Santa Monica, Dr. M. Thornburg..... Santa Ana and vicinity, Dr. J. G. Bailey..... Santa Barbara, Dr. R. F. Winchester..... Santa Paula and vicinity, Dr. D. W. Mott..... Santa Cruz, Dr. C. L. Anderson..... Santa Rosa, Dr. E. P. Smith..... Stockton, Dr. C. A. Ruggles..... Suisun, Dr. J. W. B. Reynolds..... Truckee and vicinity, Dr. W. Curtless..... Upper Lake, Dr. R. G. Reynolds..... Vallejo, Dr. W. D. Anderson..... Ventura and vic., Dr. A. J. Comstock..... Vacaville and Elmira, Dr. J. W. Stitt..... Watsonville, Dr. W. D. Rodgers..... Williams, Dr. A. W. Kimball..... Totals	

AUGUST, 1891.

Mortality reports from 66 cities, towns, and localities, aggregating a population of 706,064, show the total number of deaths in August, from all causes, to have been 975. That is 1.38 per cent per 1,000 for the month, and 16.56 per cent for the year.

There were 122 due to consumption, 52 to pneumonia, 19 to bronchitis, 15 to congestion of the lungs, 19 to diarrhoea and dysentery, 48 to cholera infantum, 59 to other diseases of the stomach and bowels, 25 to diphtheria, 6 to croup, 2 to scarlatina, 3 to measles, 7 to whooping-cough, 37 to typhoid fever, 3 to malarial fevers, 5 to cerebro-spinal fever, 30 to cancer, 3 to erysipelas, 85 to heart disease, 8 to alcoholism, and 430 to all other causes.

PREVAILING DISEASES.

Reports from 53 localities show 49 cases of cholera infantum, 155 of diarrhoea, 65 of cholera morbus, and 37 of dysentery.

Measles was reported from Middletown, Santa Cruz, Dixon, Fresno, and Mariposa.

Scarlatina was reported from 2 places only, St. Helena and Rio Vista. It has prevailed also in Sacramento during August.

Diphtheria has been reported from Alvarado as epidemic. Truckee reported 15 cases, Pomona 6. Willows has had 43 cases, but none have been reported, owing to the absence of the Health Officer.

Whooping-cough is scattered quite generally over the State. There were 25 cases in Pomona, 10 in Downey, 4 in Fresno, 20 in Lockeford, 8 in Red Bluff, 12 in Galt, and was heard from at Santa Rosa and San Diego. Ninety-four cases were reported in all. It was reported as epidemic at Elk Grove.

Seventeen cases of erysipelas were reported, 52 of typhoid fever, 368 of malarial fevers, 3 of cerebro-spinal fever, 5 of pneumonia, 7 of congestion of the lungs, 63 of bronchitis, 24 of influenza, and 6 of rheumatism.

REPORT OF THE STATE BOARD OF HEALTH.

Mariposa, Dr. W. J. Kearney-----	425	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monterey, Dr. Sidney H. Smith-----	1,200	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Napa, Dr. M. B. Pond-----	4,387	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Needles, Dr. James P. Booth-----	325	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oakland, Dr. J. P. H. Dunn-----	50,000	67	7	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pasadena and vicinity, Dr. Henry Sherk-----	10,000	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fresno and vicinity, Dr. W. H. Cope-----	800	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pomona and vicinity, Dr. E. F. Rose-----	5,000	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Bluff and vicinity, Dr. J. M. West-----	6,000	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Redding, Dr. F. F. Mitchell-----	1,861	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rio Vista and vicinity, Dr. S. C. Brown-----	1,900	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sacramento, Dr. C. B. Nichols-----	26,272	27	3	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Bernardino, Dr. C. C. Wainwright-----	3,000	11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Diego, Dr. Thos. L. Magee-----	21,000	11	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Francisco, Dr. J. W. Keeney-----	330,000	560	66	38	14	14	14	25	32	13	6	1	3	0	0	0	0	0	0	0	0	0	0	0	0
San Jose, Dr. R. K. Curshaw-----	18,027	34	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Luis Obispo, County Recorder-----	3,004	6	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Monica, Dr. E. C. Polson-----	1,700	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Paula and vicinity, Dr. D. W. Mott-----	2,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Ana and vicinity, Dr. J. S. Bailey-----	15,000	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Barbara, Dr. R. F. Winchester-----	6,864	12	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Cruz, Dr. C. L. Anderson-----	6,694	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Rosa, Dr. R. P. Smith-----	5,216	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sausalito and vic, Dr. H. J. Crumpton-----	2,000	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stockton, Dr. C. A. Ruggles-----	14,376	25	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Helena and vicinity, Dr. J. G. Dawson-----	2,200	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Soquel, Dr. H. O. Brink-----	300	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tulare City, Dr. C. F. Taggart-----	3,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Lake, Dr. R. G. Reynolds-----	300	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vallejo, Dr. W. D. Anderson-----	5,904	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vacaville and Elmira, Dr. J. W. Stitt-----	4,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Watsonville, Dr. W. D. Rodgers-----	4,600	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Woodbridge and vicinity, Dr. E. E. Lotia-----	1,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals -----	706,054	975	122	52	19	15	19	48	59	25	6	2	3	0	7	4	33	3	5	30	3	82	8	430	

SEPTEMBER, 1891.

Mortality reports from 63 cities, towns, villages, and localities, having an aggregate population of 675,551, show the total number of deaths from all causes in September to have been 929, making a death rate per 1,000 of 16.44 per annum.

Consumption was the cause of death in 129 cases, pneumonia in 38, bronchitis 13, congestion of the lungs 3, diarrhoea and dysentery in 30, cholera infantum in 30, other diseases of the stomach and bowels 63, diphtheria 33, membranous croup 10, whooping-cough 6, typhoid fever 28, malarial fevers 7, cerebro-spinal fever 3, cancer 20, erysipelas 3, heart disease 73, alcoholism 8, and from all other causes 444.

PREVAILING DISEASES.

Reports from 55 localities give 30 cases of cholera infantum, 168 of diarrhoea, 47 of cholera morbus, 41 of dysentery, 29 of measles, 10 of scarlatina, 26 of diphtheria, 18 of membranous croup, 31 of whooping-cough, 12 of erysipelas, 39 of typhoid fever, 379 of malarial fevers, 2 of cerebral fever, 11 of pneumonia, 62 of bronchitis, 9 of congestion of the lungs, 42 of influenza, and 5 of rheumatism.

In the foregoing typho-malarial fever is classed as typhoid fever, and intermittent and remittent fevers as malarial fevers.

Abstract of the Reports of Deaths and their Causes in California during September, 1891.

Other Causes	0	6	6	2	7	2	0	7	1	1	2	2	1	4	2	1	6	0	0	2	0	2	0	3	2	0	3	1	2	0	2	5	1
Alcoholism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Heart Diseases	0	0	0	0	0	2	0	1	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	9	0	0	3	3	0	3	0	
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Cancer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0		
Cerebro - Spinal Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Remittent and Intermittent Fevers	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0		
Typhoid Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4	0	0	5	0	1	0		
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0		
Whooping-Cough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0		
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Croup	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0		
Other Diseases of St'mach & Bow'ls	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	3	0	0		
Cholera Infantum	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0		
Diarrhoea and Dysentery	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	1	0	0		
Congestion of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Acute Bronchitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0		
Acute Pneumonia	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0		
Consumption	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	1	0	7	1	3	0	
Total Deaths	0	7	3	2	3	0	12	0	3	0	12	1	0	2	0	0	13	3	0	1	0	0	0	0	74	3	0	53	3	12	3	1	
Estimated Population	512	11,900	5,000	1,601	2,000	3,300	2,800	2,000	1,200	1,200	8,800	1,567	1,000	2,500	400	1,000	10,000	800	3,000	10,798	1,980	700	7,000	350	1,625	2,000	1,200	53,394	1,200	750	50,000	2,000	
LOCATIONS AND AUTHORITIES.	Alturas, Dr. John M. Forrest	Alameda, Dr. John T. McLean	Anaheim and vicinity, Dr. J. H. Bullard	Auburn, Dr. A. S. Waldo	Azusa and vicinity, Dr. J. H. Miller	Bakersfield and vic., Dr. C. A. Rogers	Benicia and vicinity, Dr. Edward Gray	Benicia and vicinity, Dr. M. F. Price	Colton and vicinity, Dr. J. O. Smith	Chico and vicinity, Dr. William King	Dixon, Dr. A. Trautman	Downeyville, Dr. Alembly Jump	Downey and vicinity, Dr. Q. J. Rowley	Etta Mills, Dr. E. W. Bathurst	El Monte and vicinity, Dr. R. D. Adams	Eureka and vicinity, Dr. S. B. Foster	Elsinore and vicinity, Dr. T. E. Ellis	Forest Hill and vic., Dr. Paul Remy	Fresno, Dr. W. S. Maupin	Folsom, Dr. E. F. Bares	Galt, Dr. Alex. Montague	Grass Valley and vic., Dr. W. C. Jones	Gonzales, Dr. C. A. E. Hertel	Haywards, Dr. G. E. Alexander	Long Beach and vic., Dr. J. W. Wood	Los Angeles and vicinity, Dr. E. A. Burchard	Los Angeles, Dr. G. MacGowan	Monterey, Dr. Sidney H. Smith	Needles and vic., Dr. James P. Booth	Oakland, Dr. J. P. H. Dunn	Ontario and vicinity, Dr. C. D. Watson	Pasadena and vic., Dr. Henry H. Sherk	Petaluma and vicinity, Dr. L. H. Patty

ABSTRACT FOR SEPTEMBER, 1891—Continued.	
LOCATIONS AND AUTHORITIES.	
Pleasanton, Dr. W. H. Cope	800
Pomona and vicinity, Dr. R. F. Rose	5,000
Red Bluff and vicinity, Dr. J. M. West	5,000
Redding and vicinity, Dr. F. P. Mitchell	5,000
Rio Vista and vicinity, Dr. S. C. Brown	1,900
Sacramento, Dr. C. B. Nichols	26,272
San Bernardino, Dr. C. C. Wainwright	3,000
San Diego, Dr. Thos. L. Magee	16,153
San Francisco, Dr. J. W. Keeney	300,000
San José, Dr. J. R. Curnow	18,027
San Luis Obispo, County Recorder	3,004
Santa Paula and vic, Dr. D. W. Mott	2,000
San Pedro and vicinity, Dr. R. W. Hill	1,500
Santa Ana and vicinity, Dr. J. G. Bailey	15,000
Santa Barbara, Dr. R. H. Winchester	5,684
Santa Clara, Dr. C. L. Anderson	5,584
Santa Maria, Dr. M. Thornburg	1,000
Santa Rosa, Dr. R. P. Smith	5,216
Sausalito and vic, Dr. H. J. Crumpton	2,000
Selma and vicinity, Dr. E. E. Brown	3,000
Stockton, Dr. C. A. Ruggles	14,376
St. Helena and vic, Dr. J. G. Dawson	2,800
Suisun and vic, Dr. J. W. B. Reynolds	2,000
Truckee and vicinity, Dr. W. Curless	1,500
Tulare City, Dr. C. F. Taggart	3,000
Upper Lake, Dr. R. G. Reynolds	300
Vacaville, Dr. W. D. Anderson	5,500
Vaughan and Elmira, Dr. J. W. Stitt	4,500
Watsonville, Dr. W. D. Rodgers	2,000
Wheatland and vicinity, Dr. L. Melton	1,000
Totals	975,551
Other Causes	0 3 1 2 1 0 19 4 5 207 21 3 1 1 4 9 3 6 1 0 1 0 1 13 2 3 2 2 0 9 0 0 1
Alcoholism	0 0 0 0 0 0 0 1 1 0 3 0 0 0 0 0 0 0 0 2 1 0 0 0 0 0 0 0 1 0 0 0 0
Heart Diseases	0 1 0 0 0 0 0 3 0 0 37 1 0 0 0 0 0 0 0 2 2 1 0 0 0 0 0 0 0 1 0 0 0 0
Erysipelas	0 0 0 0 0 0 0 0 0 0 3 0
Cancer	0 1 0 0 0 0 0 0 0 0 11 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
Cerebro - Spinal Fevers	0 0 0 0 0 0 0 0 0 0 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0
Remittent and Intermittent Fevers	0 0 1 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
Typhoid Fever	0 0 0 0 0 0 0 1 0 0 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0
Typho - Malarial Fever	0 0 0 0 0 0 0 0 1 0 2 0
Whooping-Cough	0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0
Smallpox	0 0
Measles	0 0
Scarlet Fever	0 0
Croup	0 0 0 0 0 0 0 1 0 0 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0
Diphtheria	0 0 0 0 0 0 0 1 0 0 18 0
Other Diseases of St'mach & Bow'ls	1 0 1 0 0 0 0 2 0 0 47 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0
Cholera Infantum	0 0 1 0 0 0 0 0 0 0 15 0 2 0
Diarrhoea and Dysentery	0 0 0 0 0 0 0 0 0 0 6 0
Congestion of the Lungs	0 0 0 0 0 0 0 0 0 0 2 0
Acute Bronchitis	0 0 0 0 0 0 0 0 0 0 11 0
Acute Pneumonia	0 0 0 0 0 0 0 0 0 0 27 0 2 0
Consumption	1 1 4 0 0 0 0 5 1 0 60 9 2 0
Total Deaths	2 1 4 0 2 33 8 0 11 465 37 6 1 0 7 12 6 7 1 5 1 3 4 22 22 6 5 4 0 5 0 3
Estimated Population	800 5,000 5,000 5,000 1,900 26,272 3,000 16,153 300,000 18,027 3,004 2,000 1,500 15,000 5,684 5,584 1,000 5,216 2,000 3,000 14,376 2,800 2,000 1,500 3,000 300 5,500 4,500 2,000 1,000
Totals	975,551

OCTOBER, 1891.

Mortality reports from 71 cities, towns, villages, and localities, having an aggregate population of 700,563, show the total number of deaths from all causes in October to have been 1,077, making a death rate of 1.53 per 1,000 for the month, or 18.36 per 1,000 per annum.

Consumption was the cause in 158 cases, acute pneumonia in 67, acute bronchitis in 20, congestion of the lungs in 4, diarrhoea and dysentery in 22, cholera infantum in 36, other diseases of the stomach and bowels in 73, diphtheria in 46, croup in 15, scarlatina in 1, measles in 6, whooping-cough in 1, typhoid fever in 29, remittent and intermittent fevers in 4, cerebro-spinal fever in 7, cancer in 40, heart disease in 67, alcoholism in 10, and all other causes 471.

PREVAILING DISEASES.

Reports from 63 localities give 7 cases of cholera infantum, 139 of diarrhoea, 45 of dysentery, 31 of measles, 20 of scarlatina, 48 of diphtheria, 3 of croup, 33 of whooping-cough, 24 of erysipelas, 46 of typhoid fever, 272 of malarial fevers, 7 of cerebro-spinal fever, 30 of pneumonia, 83 of bronchitis, 4 of congestion of the lungs, and 66 of influenza.

REPORT OF THE STATE BOARD OF HEALTH.

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NOVEMBER, 1891.

Mortality reports from 109 cities, towns, villages, and localities, having an aggregate population of 739,577, show the total number of deaths from all causes in November to have been 1,099, making a death rate of 1.47 per 1,000 for the month, or 17.64 per 1,000 per annum.

There were 178 deaths due to consumption, 76 to acute pneumonia, 39 to acute bronchitis, 6 to congestion of the lungs, 18 to diarrhoea and dysentery, 14 to cholera infantum, 46 to other diseases of the stomach and bowels, 35 to diphtheria, 25 to croup, 5 to scarlatina, 2 to measles, 4 to whooping-cough, 37 to typhoid fever, 5 to malarial fevers, 4 to cerebro-spinal fever, 45 to cancer, 83 to heart disease, 12 to alcoholism, and 471 to all other causes.

PREVAILING DISEASES.

Reports from 97 localities outside of the large cities give 45 cases of cholera morbus, 28 of cholera infantum, 168 of diarrhoea, 69 of dysentery, 45 of measles, 63 of scarlatina, 30 of diphtheria, 11 of croup, 132 of whooping-cough, 25 of erysipelas, 2 of typhus fever, 86 of typhoid fever, 213 of malarial fevers, 3 of cerebro-spinal fever, 76 of rheumatism, 140 of pneumonia, 14 of pleurisy, 235 of bronchitis, 15 of congestion of the lungs, 6 of enteritis, 13 of nephritis, 115 of tonsillitis, 65 of neuralgia, and 449 of la grippe.

A mild type of scarlatina prevailed quite generally throughout the State, there being but five fatalities reported. Whooping-cough has been reported as epidemic in several localities. Diseases of the respiratory organs have been very numerous; also diseases of the stomach and bowels. These may, in the majority of cases, be attributed to the quite general prevalence of la grippe, 449 cases of which were reported. It was reported as epidemic in 15 localities where the number of cases was not given. It is reported as being very frequently associated with bronchitis and pneumonia. Rheumatism and neuralgia have been quite generally prevalent. No cases of smallpox have been known to exist in the State for several months, and the entire United States has been quite free from this dreaded malady during the year. The Province of Quebec has, however, had 135 cases, all arising from one person that started the contagion. During November it has been reported in New Jersey, Pennsylvania, Ohio, Tennessee, and Texas. It will doubtless be controlled as far as practicable, but all efforts in that direction have in the past proven of no avail where unvaccinated people have been exposed to the disease. It is quite as likely to leap across the continent as to leap from Quebec to Texas, and this likelihood should be a sufficient warning for those who are unprotected to be vaccinated without delay. There should be a more strict compliance with the law denying admittance to unvaccinated children in the public schools. This should be done without exciting unnecessary alarm, but the necessity for such action should be generally understood, and be insisted upon, especially in the schools.

EXTRACTS FROM WEATHER BUREAU REPORT.

TEMPERATURE.—The weather averaged warmer than usual in November in all districts west of the Rockies.

PRECIPITATION.—No appreciable precipitation fell at Los Angeles during November; San Diego had .10 of an inch; Fresno, .20; San Francisco, .60; Sacramento and Red Bluff, .50. Northern California, San Francisco, and Red Bluff, show deficiencies of 2.25 and 2.34, respectively.

Considering the seasonal falls to date the following deficiencies are computed: Red Bluff, 4.22 inches; San Francisco, 2.83; Sacramento, 2.18; Los Angeles 1.88; San Diego, 1.45.

DECEMBER PRECIPITATION ON THE PACIFIC SLOPE.—The section of California having the greatest amount of precipitation in December lies just west of the Sierra Nevada range and in the extreme northwest (northern Humboldt and Del Norte Counties); and that having the least lies north of the San Bernardino range, east of eastern Tulare and Kern Counties. The eastern half of San Diego County also usually receives less than an inch of rainfall during the month. Along the coast from Monterey Bay to San Diego there is a general average of 4 inches of rainfall, but north of Monterey Bay along the coast it averages from 5 to 8 inches, except off the point on Cape Mendocino, in Humboldt County, where it is slightly less than 4 inches.

Abstract of the Reports of Deaths and their Causes in California during November, 1891.

Other Causes	1	4	0	0	1	5	0	1	0	2	0	2	0	0	4	0	0	1	2	1	0	0	6	0	0	0	3	1	4	1	0	0	6
Alcoholism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heart Diseases	0	2	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cancer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerebro - Spinal Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Remittent and Intermittent Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Typhoid Fever	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Whooping-Cough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Croup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Diseases of St'mach & Bow'ls	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cholera Infantum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diarrhoea and Dysentery	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Congestion of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acute Bronchitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acute Pneumonia	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Consumption	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Total Deaths	1	11	1	1	0	3	6	1	1	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
Estimated Population	550	11,900	6,000	1,000	1,601	3,300	2,700	2,000	200	2,000	1,000	1,200	1,332	1,500	8,800	1,500	1,567	1,000	2,500	400	1,000	200	10,000	1,000	3,000	1,500	10,738	700	1	6	3	0	0
LOCATIONS AND AUTHORITIES.	Alhama, Dr. John M. Forrest.....	Alameda, Dr. John T. McLean.....	Anaheim and vic., Dr. J. H. Bullard.....	Anderson, Dr. L. J. Tabler.....	Auburn, Dr. A. S. Waldo.....	Bakersfield and vic., Dr. C. A. Rogers.....	Benicia and vic., Dr. Edward Gray.....	Calistoga and vic., Dr. F. W. Mitchell.....	Cedarville, Dr. A. Gibson.....	Colton and vicinity, Dr. M. F. Price.....	College City and vic, Dr. C. H. Gibbons.....	Colusa, Dr. S. A. Gray.....	Cottonwood and vic, Dr. J. O. Smith.....	Cloverdale, Dr. R. S. Markell.....	Chico and vicinity, Dr. William King.....	Davisville and vicinity, Dr. W. E. Bates.....	Dixon, Dr. Aug. Trafton.....	Downville and vic, Dr. Alenby Jump.....	Downey and vicinity, Dr. Q. J. Howley.....	Elba Mills, Dr. E. W. Bathurst.....	El Monte and vicinity, Dr. R. D. Adams.....	Elk Grove, Dr. J. A. McKee.....	Eureka and vicinity, Dr. S. B. Foster.....	Elsinore and vicinity, Dr. Thos. E. Ellis.....	Forest Hill and vic, Dr. Paul Reudy.....	Ft. Bidwell and vic, Dr. W. J. Wakenan.....	Fresno, Dr. W. F. Maupin.....	Galt, Dr. Alex. Montague.....	Grass Valley and vic, Dr. W. R. Thomas.....	Glendora, Dr. J. H. Miller.....	Gonzales, Dr. C. A. E. Hertel.....	Girdley, Dr. J. T. Harris.....	Haywards, Dr. G. E. Alexander.....

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DECEMBER, 1891.

Mortality reports from 115 cities, towns, villages, and localities, having an aggregate population of 793,518, show the number of deaths from all causes in December to have been 1,752, making a death rate of 2.19 per 1,000 for the month, or 26.28 per 1,000 per annum.

There were 235 deaths due to consumption, 340 to acute pneumonia, 100 to acute bronchitis, 31 to congestion of the lungs, 11 to diarrhoea and dysentery, 12 to cholera infantum, 59 to other diseases of the stomach and bowels, 58 to diphtheria, 14 to croup, 5 to scarlatina, 4 to measles, 2 to whooping-cough, 36 to typhoid fever, 4 to malarial fevers, 6 to cerebro-spinal fever, 30 to cancer, 2 to erysipelas, 113 to diseases of the heart, 17 to alcoholism, and 674 to all other causes. Of the deaths placed under other causes, la grippe is responsible directly for 49, and indirectly to the greatly increased mortality from respiratory diseases.

November reports showed 199 deaths from diseases of the lungs; December 706. There is also an increase in diphtheria over November, from 35 to 58. Deaths from croup dropped down from 25 in November to 14 in December. There is also a reduction of 5 in the number of deaths from typhoid fever. There is, however, a marked increase in deaths from diseases of the heart, 113 being reported in December against 83 in November. This has no doubt a relation to la grippe and diseases of the respiratory organs.

It would appear that if it were not the prevailing epidemic with its accompanying bronchitis, pneumonia, tonsillitis, and protean perturbing influences upon the human economy, the public health would be above the average.

PREVAILING DISEASES.

Reports from 105 towns, villages, and localities outside of the larger cities, give 8 cases of inflammation of the bowels, 5 of inflammation of the brain, 5 of cholera morbus, 17 of cholera infantum, 65 of diarrhoea, 22 of dysentery, 1 of smallpox, 74 of measles, 51 of scarlatina, 38 of diphtheria, 14 of croup, 1,791 of influenza, 50 of whooping-cough, 23 of erysipelas, 61 of typhoid fever, 139 of malarial fevers, 12 of cerebro-spinal fever, 74 of tonsillitis, 24 of inflammation of the kidneys, 20 of neuralgia, 12 of pleurisy, 244 of pneumonia, 42 of rheumatism, 293 of bronchitis, 15 of congestion of the lungs, and 43 of chickenpox.

Diseases of the stomach and bowels have decreased, and diseases of the respiratory organs have largely increased, with a corresponding increase in fatalities. La grippe is greatly responsible for this increase. In addition to the 1,791 cases of this disease enumerated by reporters, it is reported prevalent or epidemic, and associated in a greater or less degree with bronchitis, pneumonia, and tonsillitis, in Ione, Livermore, Alturas, Tulare, Cloverdale, St. Helena, Biggs, Anaheim, Monterey, Martinez, San Mateo, San Rafael, Santa Maria, Soquel, Santa Cruz, National City, Knights Ferry, Azusa, Watsonville, Gridley, Benicia, Downieville, Modesto, Jackson, Marysville, Halfmoon Bay, Stockton, Petaluma, Solano County, Healdsburg, Pasadena, Santa Rosa, Forest Hill, San Diego, Anaheim, Napa, Elk Grove, Ventura, Sebastopol, and Etna Mills. This is without taking into account San Francisco, Los Angeles, Oakland, Sacramento, and San José, where it has, by common report, prevailed quite as generally as it has among those reported from. This would run the number up into the thousands, and would account for the increased death rate from diseases of the lungs. The sequels of the epidemic will appear in the death rates of several future months under other names, but they will, nevertheless, follow as a result of la grippe. It is quite reasonable to presume that the height of intensity of the epidemic has been reached, and that it will subside from want of material to work upon. So large a percentage of the population having had the disease makes this supposition warrantable. But one case of smallpox is reported in the State, and that is in quarantine at the Sacramento Pesthouse. He came recently from the vicinity of Tulare to Sacramento. Those cases that occurred among the Chinese passengers on board ship from China to San Francisco have been, and still are, in quarantine near San Francisco. There appears to have been no spread of the disease from that source. Sacramento has for more than twenty-five years enjoyed the benefits of a State law requiring all children, before entering the public schools, to be vaccinated. The result has been that while other cities have suffered from the ravages of the pestilence, resulting in depression of business and interference with traffic, Sacramento has enjoyed comparative immunity. In no instance has the disease spread from the occasional isolated cases that have been discovered. The vaccination law is now in force in the entire State, and it is not too much to hope that the entire population may, before many years, be as fully protected as Sacramento.

EXTRACTS FROM WEATHER BUREAU REPORT.

The month can be classed as having been decidedly stormy and extreme in its conditions. The rains of the month were as follows: Red Bluff 3.8, Sacramento 3.3, San Francisco 5.6, Fresno 4.0, Los Angeles 2.0, San Diego 1.3. This is a deficiency of 1.4 inches in the Sacramento Valley, and from .9 to 1.5 in Southern California, but an excess of 1.7 at Fresno, and .5 at San Francisco. In California the mean temperature was 4° below normal, except on the coast, where it was from 1° to 2° below, and from 4° to 6° below in the interior. The warmest days were the 1st, 11th, 14th, and 15th, and the coldest were the 5th, 6th, 7th, 8th, 24th, 25th, and 26th.

ABSTRACT FOR DECEMBER, 1891—Continued.

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* Including towns reporting no deaths, of an aggregate population of 4,650.

JANUARY, 1892.

Mortality reports from 118 cities, towns, villages, and localities, having an aggregate population of 819,913, show the number of deaths from all causes, in January, to have been 1,622, making a death rate of 1.97 per 1,000 for the month, or 23.64 per 1,000 per annum.

There were 223 deaths due to consumption, 285 to acute pneumonia, 75 to acute bronchitis, 12 to congestion of the lungs, 4 to diarrhoea and dysentery, 6 to cholera infantum, 43 to other diseases of the stomach and bowels, 42 to diphtheria, 16 to croup, 14 to scarlatina, 5 to measles, 7 to whooping-cough, 27 to typhoid fever, 2 to malarial fevers, 10 to cerebro-spinal fever, 44 to cancer, 4 to erysipelas, 110 to diseases of the heart, 12 to alcoholism, 96 to la grippe, and to all other causes 585.

There were 595 deaths from diseases of the lungs in January, as against 706 in December, and 42 from diphtheria, as against 58 in December, and 27 of typhoid fever, as against 36 in December. There was, however, an increase in mortality from la grippe, from 49 in December, to 96 in January. The death rate is, nevertheless, lowered from 2.19, in December, to 1.97 in January.

PREVAILING DISEASES.

Reports from 107 towns, villages, and localities, outside of the larger cities, give 7 of inflammation of the bowels, 5 of cholera morbus, 5 of cholera infantum, 81 of diarrhoea, 19 of dysentery, 102 of measles, 129 of scarlatina, 39 of diphtheria, 20 of croup, 1,796 of influenza, 191 of whooping-cough, 40 of erysipelas, 58 of typhoid fever, 118 of malarial fevers, 9 of cerebro-spinal fever, 174 of tonsilitis, 26 of inflammation of the kidneys, 89 of neuralgia, 35 of pleurisy, 154 of pneumonia, 80 of rheumatism, 381 of bronchitis, 27 of congestion of the lungs, 5 of chickenpox, 16 of pharyngitis, and 3 of inflammation of the brain.

There seems to have been no diminution in the prevalence of influenza, as it is reported from all quarters, and the mortality from that cause has nearly doubled in January.

The smallpox patient admitted to the Sacramento Pesthouse in December has been discharged as cured, and no new cases have appeared. The Chinese at the San Francisco quarantine station have also been discharged. The State is, at this time, free from smallpox.

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FEBRUARY, 1892.

Mortality reports from 118 cities, towns, villages, and localities, having an aggregate population of 813,877, show the number of deaths from all causes in February to have been 1,208, making a death rate of 1.48 per 1,000 for the month, or 17.76 per 1,000 per annum.

There were 129 deaths due to consumption, 122 to acute pneumonia, 57 to acute bronchitis, 12 to congestion of the lungs, 2 to diarrhoea and dysentery, 3 to cholera infantum, 43 to other diseases of the stomach and bowels, 42 to diphtheria, 9 to croup, 14 to scarlatina, 14 to measles, 6 to whooping-cough, 17 to typhoid fever, 10 to cerebro-spinal fever, 27 to cancer, 3 to erysipelas, 65 to diseases of the heart, 9 to alcoholism, 29 to la grippe, and to all other causes 535.

The death rate per 1,000 has decreased from 1.97 in January to 1.48 in February.

The most marked reduction in the death rate appears to be in diseases of the respiratory organs. In January there were 595 deaths from diseases of the lungs, while in February there were 330, being a reduction of 215.

The fatalities from la grippe fell from 96 in January to 29 in February, and deaths from diseases of the heart dropped from 110 in January to 65 in February.

PREVAILING DISEASES.

Reports from 109 towns, villages, and localities outside of the larger cities, give 8 cases of inflammation of the bowels, 13 of cholera morbus, 5 of cholera infantum, 84 of diarrhoea, 29 of dysentery, 173 of measles, 37 of scarlatina, 18 of diphtheria, 5 of croup, 558 of influenza, 135 of whooping-cough, 30 of erysipelas, 22 of typhoid fever, 176 of malarial fevers, 118 of tonsillitis, 5 of inflammation of the kidneys, 69 of neuralgia, 34 of pleurisy, 96 of pneumonia, 79 of rheumatism, 224 of bronchitis, 2 of congestion of the lungs, 4 of chickenpox, 20 of pharyngitis, and 6 of inflammation of the brain.

There is a great reduction in the prevalence of la grippe. One thousand seven hundred and ninety-eight cases were reported from the smaller towns in January, and but 558 in February. It is abating everywhere, except in a few localities where the cold weather prevails. Measles and whooping-cough are epidemic in several places. Fresno has an advanced case of leprosy in a Chinese.

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ABSTRACT FOR FEBRUARY, 1892—Continued.

LOCATIONS AND AUTHORITIES.	Estimated Popula- tion	Total Deaths	Consumption	Acute Pneumonia.	Acute Bronchitis..	Congestion of the Lungs	Diarrhoea and Dys- entery	Cholera Infantum.	Other Diseases of St'mach & Bow'ls	Diphtheria	Croup	Scarlet Fever	Measles	Smallpox	Whooping-Cough	Typho - Malarial Fever	Typhoid Fever	Remittent and In- termittent Fevers	Cerebro - Spinal Fever	Cancer	Erysipelas	Heart Diseases	Alcoholism	Other Causes	
Santa Barbara, Dr. R. F. Winchester	5,864	11	5	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4	
Santa Cruz and vic, Dr. B. A. Plant, H. O.	10,000	11	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7	
Santa Rosa, Dr. R. P. Smith	5,216	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sausalito and vic, Dr. G. C. Macdonald	2,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Selma and vicinity	3,000	3	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stockton, Dr. C. A. Ruggles	14,378	22	4	2	0	1	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
St. Helena and vic, Dr. W. J. G. Dawson	2,800	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Suisun and vic, Dr. J. W. B. Reynolds	4,000	2	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Susanville and vic, Dr. A. Milliken	800	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Soquel and vicinity, Dr. H. O. Brink	400	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Truckee and vicinity, Dr. W. Curless	1,300	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tulare City, Dr. C. F. Taggart	2,000	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Upper Lake, Dr. R. G. Reynolds	300	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Vallejo and vic, Dr. W. D. Anderson	6,000	8	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ventura and vic, Dr. A. J. Comstock	9,000	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Watsonville and vic, Dr. W. D. Rodgers	2,500	4	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Winters and vicinity, Dr. Z. T. Magill	1,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Willows and vicinity, Dr. L. P. Tooley	3,000	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Williams, Dr. A. W. Kimball	500	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Yuba City, Dr. T. P. Perry	700	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	813,877	1,208	189	122	57	12	2	3	43	42	9	14	14	0	0	6	0	17	0	10	27	3	65	9	564

Including the following towns, reporting no deaths: Auburn (pop., 1,801), Biggs (pop., 750), Calico and vicinity (pop., 1,500), Davisville and vicinity (pop., 1,500), Dixon and vicinity (pop., 2,500), Galt (pop., 700), Igo (pop., 200), Knights Ferry (pop., 250), Lincoln and vicinity (pop., 1,000), Millville (pop., 300), Nicolaus (pop., 100), Oakdale (pop., 1,000), Placerville (pop., 1,684), San Mateo and vicinity (pop., 2,000), Santa Paula and vicinity (pop., 2,000), Sebastopol (pop., 500), Sierra Valley and vicinity (pop., 1,000), Vacaville and vicinity (pop., 4,900), Wheatland (pop., 700), Woodbridge (pop., 300).

MARCH, 1892.

Mortality reports from 116 cities, towns, villages, and localities, having an aggregate population of 813,821, show 1,176 deaths from all causes during the month of March. This corresponds to a death rate of 1.44 per 1,000 for March, or 17.23 per 1,000 per annum.

There were 191 deaths due to consumption, 89 to pneumonia, 59 to acute bronchitis, 11 to congestion of the lungs, 1 to diarrhoea, 1 to cholera infantum, 55 to other diseases of the stomach and bowels, 32 to diphtheria, 10 to croup, 14 to scarlatina, 12 to measles, 8 to whooping-cough, 19 to typhoid fever, 3 to malarial fevers, 4 to cerebro-spinal fever, 34 to cancer, 2 to erysipelas, 109 to diseases of the heart, 9 to alcoholism, 9 to influenza, and 533 to all other causes.

This shows a continued reduction in fatalities from respiratory diseases. In January there were 595 deaths from diseases of the lungs, in February 380, and in March 330.

There were 98 deaths in January from la grippe, 29 in February, and 9 in March.

January showed 110 deaths from diseases of the heart, February 66, and March 109.

Any reasons that might be advanced for these sudden fluctuations must necessarily be conjectural.

PREVAILING DISEASES.

Reports of prevailing diseases from 105 towns, villages, and localities outside of the large cities, show 60 cases of acute pneumonia, 21 of pleuritis, 209 of acute bronchitis, 5 of congestion of the lungs, 72 of diarrhoea, 30 of dysentery, three of cholera infantum, 4 of cholera morbus, 13 of diphtheria, 8 of croup, 93 of scarlatina, 90 of measles, 141 of whooping-cough, 181 of malarial fevers, 56 of typhoid fever, 6 of cerebro-spinal fever, 23 of erysipelas, 2 of inflammation of the brain, 11 of inflammation of the bowels, 15 of inflammation of the kidneys, 272 of influenza, 73 of neuralgia, 2 of puerperal fever, 79 of rheumatism, 83 of tonsillitis, 30 of pharyngitis, and one of chickenpox.

Measles are reported prevalent at Elk Grove, Monrovia, Watsonville, Folsom, and San Diego.

Sierra Valley reported 25 cases of scarlatina, Wheatland 23, Needles 20, and Santa Rosa 12. Fatalities have been very light, as the fever has been of a mild type.

Whooping-cough has been epidemic at Azusa, and has prevailed to some extent at Monrovia, Martinez, Auburn, Watsonville, and Marysville. Mumps has been reported from many different points.

ABSTRACT FOR MARCH, 1892—Continued.

LOCATIONS AND AUTHORITIES.	Estimated Popula- tion	Deaths																						
		Other Causes	Alcoholism	Heart Diseases	Erysipelas	Cancer	Cerebro - Spinal Fever	Remittent and In- termittent Fevers	Typhoid Fever	Typho - Malarial Fever	Whooping-Cough	Smallpox	Measles	Scarlet Fever	Croup	Diphtheria	Other Diseases of St'mach & Bow'ls	Cholera Infantum	Diarrhoea and Dys- entery	Congestion of the Lungs	Acute Bronchitis	Acute Pneumonia	Consumption	Total Deaths
Suisun and vic., Dr. J. W. B. Reynolds	4,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Sutter County, Dr. T. T. Perry	5,469	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Sequel and vicinity, Dr. H. O. Brink	400	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Templeton and vic., Dr. O. P. Paulding	400	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Truckee and vicinity, Dr. W. Curless	1,300	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Tulare City, Dr. C. F. Taggart	2,000	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Valejo and vic., Dr. W. D. Anderson	6,000	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Ventura and vic., Dr. A. J. Comstock	9,000	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Vacaville and vicinity, Dr. J. W. Stitt	4,500	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
Watsonville and vic., Dr. W. D. Rodgers	2,500	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Wheatland and vic., Dr. Lewis Melton	700	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Willows and vicinity, Dr. Rooney	3,000	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Woodbridge, Dr. S. E. Latta	300	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Woodland, R. B. Mosby, H. O.	3,069	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Totals	783,684	1,176	191	89	39	11	1	1	55	32	10	14	12	0	8	0	19	3	4	34	2	109	9	533

Including the following towns reporting no deaths: Anderson (pop., 1,000), Calico (pop., 500), College City (pop., 1,000), Downieville and vicinity (pop., 1,000), Fort Bidwell and vicinity (pop., 1,500), Fresno (pop., 10,780), Fresno Flata, (pop., 600), Gonzales (pop., 350), Halfmoon Bay (pop., 450), Igo (pop., 200), Knights Ferry (pop., 250), Livermore (pop., 1,500), Lincoln (pop., 1,000), Lakeport (pop., 1,100), National City (pop., 1,200), Nicolaus (pop., 400), Needles and vicinity (pop., 750), San Rafael (pop., 3,891), Santa Maria (pop., 1,000), Sebastopol (pop., 500), Tehama (pop., 350), Upper Lake (pop., 300), Winters and vicinity (pop., 1,000), and Williams (pop., 500).

APRIL, 1892.

Mortality reports from 117 cities, towns, villages, and localities, having an aggregate population of 789,931, show 1,027 deaths from all causes during the month of April. This corresponds to a death rate of 1.030 per 1,000 for April, or 15.60 per 1,000 per annum.

There were 195 deaths due to consumption, 78 to pneumonia, 35 to acute bronchitis, 10 to congestion of the lungs, 9 to diarrhoea and dysentery, 5 to cholera infantum, 41 to other diseases of stomach and bowels, 28 to diphtheria, 11 to croup, 6 to scarlatina, 9 to measles, 11 to whooping-cough, 15 to typhoid fever, 4 to malarial fevers, 8 to cerebro-spinal fever, 39 to cancer, 2 to erysipelas, 84 to diseases of the heart, 9 to alcoholism, 2 to influenza, and 430 to all other causes.

This shows a continued though small reduction in fatalities from respiratory diseases.

In January there were 595 deaths from diseases of the lungs, in February 380, in March 330, and in April 306.

There were 96 deaths in January from la grippe, 29 in February, 9 in March, and 2 in April.

There were 6 deaths from scarlatina in April as against 14 in March.

PREVAILING DISEASES.

Reports of prevailing diseases from 85 towns, villages, and localities outside of the large cities, show 54 cases of acute pneumonia, 21 of pleurisy, 222 of acute bronchitis, 5 of congestion of the lungs, 180 of diarrhoea, 55 of dysentery, 10 of cholera infantum, 19 of cholera morbus, 13 of diphtheria, 20 of croup, 36 of scarlatina, 72 of measles, 87 of whooping-cough, 191 of malarial fevers, 17 of typhoid fever, 1 of cerebro-spinal fever, 49 of erysipelas, 4 of inflammation of the brain, 15 of inflammation of the bowels, 15 of inflammation of the kidneys, 174 of influenza, 76 of neuralgia, 104 of rheumatism, 89 of tonsillitis, and 27 of pharyngitis.

Measles is reported prevalent at Merced and Azusa.

There does not appear to have been any prevailing disease in April, but the temperature was below normal during the entire month, with unusually cloudy weather and damp atmosphere. There have been in consequence considerable rheumatism, neuralgia, and many sore throats.

On April 21st, a case of varioloid was discovered in Berkeley, Alameda County, in a married man, 25 years of age, by occupation a handler of foreign goods. The origin is unknown, but the patient stated to the local Health Officer, Dr. F. H. Payne, that about 10 days before he was attacked, a muffled Chinaman, having sores on his face, took a seat in a car next to him on the local train from San Francisco. No such Chinaman has yet been found. Strict quarantine, isolation, and vaccination were the restrictive and preventive measures adopted, and no new cases have developed yet.

On May 3d a case of varioloid was discovered on a fishing boat, on the Sacramento River, 4 miles above Sacramento City. The afflicted person is a native of the Sandwich Islands, aged 37 years, and came directly from San Francisco. Before being sent to the pesthouse, he walked with a companion from the wharf through 7 blocks of the business portion of the city, and voluntarily presented himself to the local authorities. The isolation of pesthouse regulations has been applied to the patient and his companion.

Livmore, Dr. E. M. Keys.....	1,500
Laporte, Dr. Chando Pearson.....	600
Lakeport, Dr. P. H. Thornton.....	1,200
Los Gatos, Dr. F. W. Knowles.....	1,650
Lozdi and vicinity, Dr. E. A. Burchard..	1,500
Los Angeles, Dr. G. Macdowen.....	50,394
Marysville, Dr. D. Powell.....	4,000
Milville, Dr. J. N. Crabb.....	300
Modesto, Dr. W. J. Wilhte.....	2,387
Mariposa, Dr. W. J. Kearney.....	1,000
Midletown and vic., Dr. R. E. Hartley....	800
Monterey, Dr. S. H. Smith.....	1,200
Napa, Dr. M. B. Pond.....	6,000
National City, Dr. J. W. Keene.....	1,200
Needles and vic., Dr. James P. Booth....	750
Nevada City and vic., Dr. C. L. Muller...-	3,000
Newcastle, Dr. M. Schnabel.....	175
Oakland, Dr. J. P. H. Dunn.....	50,000
Oroville, Dr. J. H. M. Karsner.....	2,000
Ontario and vicinity, Dr. C. D. Watson....	2,000
Pasadena and vic., Dr. Henry H. Sherk....	10,000
Petaluma and vic., Dr. L. H. Patty.....	8,000
Plymouth, Dr. W. A. Norman.....	1,200
Pomona and vicinity, Dr. R. T. Rose.....	5,000
Pas Robles, Dr. C. C. Cleaves.....	1,000
Pleasanton and vic., Dr. Wm. H. Cope....	800
Red Bluff and vic., Dr. J. M. West.....	5,000
Redlands and vicinity, Dr. J. M. Wheat....	3,600
Rio Vista and vicinity, Dr. B. Dezier....	1,800
Rocklin, Dr. A. M. Stafford.....	1,020
Sacramento, Dr. H. L. Nichols.....	26,272
San Bernardino Co., Dr. C. C. Wainwright.	29,502
S. Bernardino Co., Thomas L. Magee.....	16,153
San Diego, Dr. Thomas L. Magee.....	14,562
San Francisco, Dr. J. W. Kenney.....	82,372
San Jose, Dr. J. R. Currow.....	38,752
San Luis Obispo County Recorder.....	3,000
San Pedro, Dr. R. W. Hill.....	1,000
San Rafael, Dr. W. J. Wickman.....	3,881
San Leandro, Dr. O. J. Lynch.....	2,500
Santa Ana and vicinity, Dr. J. P. Boyd....	15,000
Santa Barbara, Dr. F. M. Casal.....	5,864
Santa Clara, Dr. Geo. W. Seifer.....	2,887
Santa Cruz, Dr. B. A. Plant.....	10,000
Santa Rosa, Dr. R. F. Smith.....	5,216
Santa Paula and vic., Dr. D. W. Mofft....	2,000

ABSTRACT FOR APRIL, 1892—Continued.

LOCATIONS AND AUTHORITIES.	Estimated Popula- tion	Deaths																						
		Other Causes	Alcoholism	Heart Diseases	Erysipelas	Cancer	Cerebro - Spinal Fever	Remittent and Inter- mittent Fevers	Typhoid Fever	Typho - Malarial Fever	Whooping-Cough	Smallpox	Measles	Scarlet Fever	Croup	Diphtheria	Other Diseases of St'mach & Bow'ls	Cholera Infantum	Diarrhoea and Dys- entery	Congestion of the Lungs	Acute Bronchitis	Acute Pneumonia	Consumption	Total Deaths
Sausalito and vic., Dr. G. C. Macdonald	2,000	2	7	2	1	3	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3
Stockton, Dr. C. A. Ruggles	14,376	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	14
St. Helena and vic., Dr. W. J. G. Dawson	2,800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Suisun and vic., Dr. J. W. B. Reynolds	4,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sutter County, Dr. T. P. Perry	5,469	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
North Temescal, Dr. B. T. Mouser	3,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Truckee and vicinity, Dr. W. Curless	1,300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Tulare City, Dr. C. F. Taggart	2,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Ventura and vic., Dr. A. J. Comstock	9,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Vacaville and vicinity, Dr. J. W. Stitt	4,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Watsonville and vic., Dr. W. D. Rodgers	2,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Winters and vicinity, Dr. Z. T. Magill	1,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Williams, Dr. A. W. Kimball	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Woodland, R. B. Mosby, H. O.	3,069	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Totals	789,931	1,027	195	76	35	10	9	5	41	23	11	6	9	0	11	0	15	4	8	39	2	84	9	432

Included in the above are the following places reporting no deaths: Calico (pop., 500), Calistoga and vicinity (pop., 2,000), Cedarville (pop., 200), Downieville and vicinity (pop., 1,000), Elsinore (pop., 800), Fort Bidwell and vicinity (pop., 1,500), Igo (pop., 300), Jackson and vicinity (pop., 2,000), Knights Ferry (pop., 260), Lockeford (pop., 400), Lincoln (pop., 1,000), Merced (pop., 2,000), Nicolaus (pop., 100), Oakdale (pop., 1,000), Pacific Grove (pop., —), Placerville and vicinity (pop., 1,684), Roseville (pop., 450), Sebastopol (pop., 500), Sierra Valley and vicinity (pop., 1,000), Soquel and vicinity (pop., 400), Templeton and vicinity (pop., 400), Tehama (pop., 350), Upper Lake (pop., 300), Wheatland (pop., 700), and Woodbridge (pop., 300).

MAY, 1892.

Mortality reports from 110 cities, towns, villages, and sanitary districts, having an aggregate population of 804,553, show 1,066 deaths from all causes during the month of May. This corresponds to a death rate of 1.31 per 1,000 for May, or 15.72 per annum.

There were 162 deaths due to consumption, 66 to pneumonia, 41 to bronchitis, 8 to congestion of the lungs, 10 to diarrhoea and dysentery, 17 to cholera infantum, 44 to other diseases of the stomach and bowels, 29 to diphtheria, 11 to croup, 15 to scarlatina, 6 to measles, 11 to whooping-cough, 14 to typhoid fever, 5 to malarial fevers, 1 to cerebrospinal fever, 31 to cancer, 4 to erysipelas, 96 to diseases of the heart, 6 to alcoholism, 2 to influenza, and 478 to all other causes.

This shows a continued though small reduction in fatalities from respiratory diseases. In January there were 595 deaths from diseases of the lungs, in February 380, in March 330, in April 306, and in May 277.

There were 96 deaths in January from la grippe, 29 in February, 9 in March, 2 in April, and 2 in May.

PREVAILING DISEASES.

Reports of prevailing diseases from 70 towns and sanitary districts outside of the large cities, show 18 cases of acute pneumonia, 17 of pleurisy, 135 of acute bronchitis, 5 of congestion of the lungs, 164 of diarrhoea, 65 of dysentery, 25 of cholera infantum, 42 of cholera morbus, 31 of diphtheria, 6 of croup, 23 of scarlatina, 57 of measles, 83 of whooping-cough, 150 of malarial fevers, 18 of typhoid fever, 30 of erysipelas, 17 of inflammation of the brain, 17 of inflammation of the bowels, 10 of inflammation of the kidneys, 63 of influenza, 77 of neuralgia, 70 of rheumatism, and 89 of tonsillitis.

Measles is reported at Merced and Santa Clara, but is also prevalent in other places. Whooping-cough prevailed in a number of localities. Diphtheria was reported epidemic at Riverside and College City, and scarlatina at Merced.

The case of varioloid at Berkeley and the one at Sacramento have both been discharged, and although sufficient time has elapsed, no new cases have developed.

Another case was reported from San Pablo, Contra Costa County, but it has been impossible to obtain reliable data concerning the previous history of the man afflicted. The usual precautions were adopted, and the patient will soon be, if he is not already, discharged.

A case of leprosy was recently discovered in Oakland, which came not long ago from the Hawaiian Islands. The local Board of Health was disturbed concerning the disposition which should be made of the case, inasmuch as there are no accommodations for lepers in California, outside of the county pesthouses. The leper (a woman) relieved the city of her unwelcome presence, and was next found in the City and County Hospital in San Francisco. The Health Department of Oakland is naturally solicitous concerning the large family of which the leprous woman was a member, all of whom are still domiciled there, including the woman's infant, only 2 months old.

The following resolution by the Oakland Board of Health will show the helpless condition in which any city or county may find itself placed, when brought to confront an unusual sanitary problem. There is appended, also, an extract from a letter by Dr. William M. Lawlor, Quarantine Officer and United States Quarantine Inspector at San Francisco:

"OAKLAND, CAL., June 4, 1892.

"Resolved, That the Secretary notify the State Board of Health of there being a large family in Oakland, one of the members of which, a woman with leprosy, was recently taken to the pesthouse in San Francisco;

"That her child, two months old, is still with the family in Oakland;

"That this family recently came from the Sandwich Islands;

"That the woman had leprosy before leaving the Sandwich Islands, but was permitted to land in San Francisco, from which place they came to Oakland;

"What measures should be taken, if any, in dealing with this family?

"Yours respectfully,

"PAUL J. SCHAFER,

"Secretary of the Board of Health of the City of Oakland."

The following is an explanatory extract from a letter by Dr. William M. Lawlor, Quarantine Officer at San Francisco:

"I have made inquiries as to the case of leprosy that was discovered in Oakland, and subsequently found in the City and County Hospital. From all that I can learn, the patient is afflicted with the disease in her hands and feet. I call attention to the fact that as leprosy is not a disease that comes under the head of strict quarantine regulations, such as smallpox or the other contagious diseases, that it would be an easy matter for a person afflicted, as the case under consideration, to pass my inspection without detection, and in this connection I wish to call attention to the fact that the case under discussion was in the hospital from Monday until the following Saturday without being discovered as a case of leprosy. It is the custom of this department to see and personally pass upon every soul aboard of all incoming vessels from foreign ports, and the strictest supervision is exercised to prevent the introduction of contagious diseases. We are of opinion that the above case comes strictly under the head of the United States Immigration Department, for upon the discovery of such a case the vessel would not be

detained, but the case of leprosy should be immediately returned to the port from which it came, and such action would have to be taken by the United States Immigration Inspector. Several cases have recently been discovered by this department, and reported to the Immigration Inspector, and have by him been returned. In this connection, I would respectfully suggest to the Governor the propriety of calling the attention of the authorities at Washington to the urgent necessity of having a competent medical officer connected with the United States Immigration Department, to make the examinations of all passengers coming under the Immigration Act, and by this means have a double check on all cases likely to be imported into the State. With leprosy, the most urgent and complete vigilance should be exercised to prevent its introduction, for we are menaced with this danger by the large and increasing immigration from the Hawaiian Islands of a class of immigrants in the extreme undesirable, consisting of the poorest class of Portuguese and Japanese, who have been working under contract. The resolutions passed by the Oakland Board of Health, with reference to the family, show the necessity of having a State lazaretto established, where such cases could be kept under observation. Leprosy cases are liable to be discovered and developed in any county of the State; they are liable to be introduced at any time by persons having the disease, and not having discovered it, or, having the germs in their system, it is developed at a later period. Such cases should not be thrown on San Francisco County simply because they were obliged to enter the State by the port of San Francisco."

It does not matter what legal points this case may involve. It serves merely to indicate that it must soon become the duty of the State to care for the unfortunates who may be found afflicted with this incurable and loathsome disease, within the borders of its territory, in a manner more appropriate and humane than in the county pesthouses.

Nearly every populous county in the State has more than once cared for lepers in pesthouses, but San Francisco has borne the greatest share of the burden. Those counties which have found it inconvenient to erect pesthouses, have kindly assisted the afflicted person to the metropolis, and in this way a considerable number have been cared for nearly all the time, which properly belonged in other counties. Sacramento has had a number of cases. Yolo had one or two in recent years. Fresno had one not long ago.

The State Board of Health has under consideration a bill, to be presented to the next Legislature, providing for a lazaretto in which to sequestrate this class of incurables, for all must agree that it is neither prudent nor proper to treat them as they are now being cared for.

Abstract of the Reports of Deaths and their Causes in California during May, 1892.

Other Causes	0	11	2	3	1	1	1	1	1	0	2	0	0	2	0	1	0	5	3	0	1	2	0	0	0	9	0	1	0	1	0	0	0	
Alcoholism	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
Heart Diseases	0	1	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Erysipelas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cancer	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cerebro - Spinal Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Remittent and Intermittent Fevers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
Typhoid Fever	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
Typho - Malarial Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Whooping-Cough	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Smallpox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Measles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Scarlet Fever	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Croup	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Other Diseases of St'mach & Bow'ls	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cholera Infantum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Diarrhœa and Dysentery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Congestion of the Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acute Bronchitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acute Pneumonia	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Consumption	0	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Deaths	0	17	4	0	6	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	
Estimated Population	550	12,000	5,000	1,000	1,000	1,601	2,000	5,500	750	500	2,000	800	2,000	700	1,200	1,500	3,880	1,500	1,567	1,000	2,500	1,000	1,000	200	10,000	1,500	600	10,798	1,860	700	5,000	500	700	
LOCATIONS AND AUTHORITIES.	Alturas, Dr. John M. Forrest	Alameda, Dr. John T. McLean	Anaheim and vicinity, Dr. J. H. Bullard	Antioch and vicinity, Dr. W. S. George	Anderson, Dr. L. J. Tabler	Auburn, Dr. A. S. Waldo	Azusca and vicinity, Dr. J. H. Miller	Berkeley, Dr. F. H. Payne	Biggs, Dr. O. C. Hawkins	Calico, Dr. A. R. Rhea	Calistoga, Dr. F. W. Mitchell	Carpenteria and vicinity, Dr. R. Cauch	Colton and vicinity, Dr. M. F. Price	College City, Dr. C. H. Gibbons	Cottonwood and vicinity, Dr. J. O. Smith	Cloverdale, Dr. R. S. Markell	Chico and vicinity, Dr. William King	Davisville, Dr. W. E. Bates	Dixon, Dr. Aug. Trafton	Downville and vic, Dr. Alembly Jump	Downey and vicinity, Dr. Q. J. Rowley	Elma Mills and vic, Dr. E. W. Bathurst	El Monte and vicinity, Dr. R. D. Adams	Elk Grove, Dr. J. H. McKee	Eureka and vicinity, Dr. S. B. Foster	Ft. Bidwell and vic, Dr. W. J. Wakeman	Fresno Flats, Dr. J. N. McIntowan	Fresno, Dr. W. T. Maupin	Folsom, John Harris, H. O.	Galt, Dr. Alex. Montague	Grass Valley, Dr. W. R. Thomas	Gonzales and Soledad, Dr. C. A. E. Hertel	Gridley, Dr. J. T. Harris	

[illegible]

JUNE, 1892.

Mortality reports from 109 cities, towns, villages, and sanitary districts, having an aggregate population of 788,073, show 121 deaths from all causes during June. This corresponds to a death rate of 1.29 per 1,000, or 15.48 per annum.

There were 136 deaths due to consumption, 58 to pneumonia, 24 to bronchitis, 5 to congestion of the lungs, 17 to diarrhoea and dysentery, 33 to cholera infantum, 63 to other diseases of the stomach and bowels, 22 to diphtheria, 7 to croup, 14 to scarlatina, 7 to measles, 5 to whooping-cough, 14 to typhoid fever, 3 to malarial fevers, 8 to cerebro-spinal fever, 1 to erysipelas, 34 to cancer, 89 to diseases of the heart, 6 to alcoholism, and 475 to other causes.

No deaths from la grippe were reported in June.

PREVAILING DISEASES.

Reports of prevailing diseases from 70 towns and sanitary districts outside of the large cities, show 23 cases of pneumonia, 77 of bronchitis, 6 of pleuritis, 6 of congestion of the lungs, 200 of diarrhoea, 57 of dysentery, 53 of cholera morbus, 32 of cholera infantum, 77 of inflammation of the bowels, 20 of diphtheria, 32 of scarlatina, 31 of measles, 15 of whooping-cough, 43 of la grippe, 24 of typhoid fever, 118 of malarial fevers, 6 of cerebro-spinal fever, 13 of erysipelas, 69 of rheumatism, 63 of neuralgia, and 72 of tonsillitis.

June was comparatively a healthy month. The death rate per 1,000 was 1.29, against 1.47 in 1891. There is shown an increase of diseases of the stomach and bowels, but that is expected in summer, when the fruit ripens. Cholera infantum is more frequently fatal during the warm weather.

Those diseases which increased the mortuary reports of the winter continue to abate. Smallpox is not reported at all. It is, however, reported epidemic at Victoria, B. C., and although Oregon and Washington lie between us and that point, it may very soon be necessary to place an Inspector at the northern boundary of the State to detain any persons showing symptoms of the disease.

Cholera, true to tradition, is following upon the heels of la grippe. It has leaped all boundaries between Asia and Europe, and is reported as devastating the famine-stricken districts of Russia. But with the rapid and easy methods of travel, cholera no longer moves at a man's pace. Like a winged messenger, it has arrived in the great capitals of Europe, and consultations are being held to decide what best may be done to stay its fatal spread. Common prudence would dictate that we look after our private and municipal sanitary affairs. It is just as well to expect no benefits from quarantine in cholera. It has never alone checked the progress of this disease. Cholera has always mocked at quarantine, but it has been repeatedly balked by want of filth and polluted soil to breed in and spread from. It is the duty of medical men to explain to the public that cholera is not contracted, like smallpox, measles, and scarlatina, but from swallowing the germs in water and food, or, after they have effected a lodgment in the throat, from a vitiated and poisoned atmosphere. We may not be visited at all, but the specter will be shorn of half its terrors when we have done all there is to be accomplished to hold it back.

Abstract of the Reports of Deaths and their Causes in California during June, 1892.

[illegible]

FINANCIAL STATEMENT.

STATEMENT OF THE EXPENSES OF THE STATE BOARD OF HEALTH FOR THE FORTY-SECOND
FISCAL YEAR, ENDING JUNE 30, 1891.

Appropriation March 21, 1889.....		\$1,500 00
Balance from forty-first fiscal year.....		303 14
1890.		
July—Expressage.....	\$1 90	
Traveling expenses.....	25 00	
Traveling expenses, C. A. Ruggles.....	14 50	
Traveling expenses, J. M. Briceland.....	29 40	
Traveling expenses, H. S. Orme.....	50 00	
Postage stamps.....	20 00	
Telegrams.....	1 85	
Typewriter.....	100 00	
Office rent.....	25 00	
Aug.—Expressage.....	55	
Telegraphing.....	95	
Traveling expenses.....	20 00	
Postage stamps.....	15 00	
Stationery.....	2 55	
Wood engraving for report.....	20 00	
Office rent.....	25 00	
Sept.—Carpet sweeper for office.....	3 50	
Duster.....	50	
Postage stamps.....	15 50	
Stationery.....	9 10	
Telegraphing.....	2 10	
Post Office box rent.....	2 00	
Subscription "Annual of Hygiene".....	14 50	
Office rent.....	25 00	
Oct.—Typewriter cabinet.....	13 30	
S. S. Herrick, compiling laws.....	75 00	
Expressage.....	40	
Traveling expenses, Secretary.....	32 50	
Traveling expenses, J. M. Briceland.....	40 50	
Traveling expenses, C. A. Ruggles.....	51 90	
Traveling expenses, H. S. Orme.....	67 75	
Office rent.....	25 00	
Telegraphing.....	9 39	
Nov.—Stamps.....	10 00	
Hopkins.....	1 00	
Stamps.....	22 00	
Wrappers.....	5 00	
Expressage on Biennial Report.....	40 95	
Freight on Biennial Report.....	1 00	
Expressage on Biennial Report.....	12 80	
Stamps.....	47 00	
Telegraphing.....	40	
Stationery.....	2 95	
Office rent.....	25 00	
Crocker & Co.....	8 00	
Stamps.....	23 00	
Traveling expenses.....	15 00	
Expressage.....	1 75	
Stamps.....	12 00	
Traveling expenses.....	15 00	
H. S. Crocker & Co., envelopes.....	13 50	
Traveling expenses.....	15 00	
Traveling expenses, C. A. Ruggles.....	17 00	
Telegraphing.....	2 15	
Post Office box rent.....	2 00	
Office rent.....	25 00	

1891.

Jan.—C. S. Houghton	40	
H. S. Crocker, stationery	3 15	
Stamps	4 00	
"Sanitary News"	2 00	
Traveling expenses, C. A. Ruggles	12 90	
Traveling expenses, J. M. Briceland	27 00	
Traveling expenses, H. S. Orme	47 00	
"Sanitary Record"	3 02	
"Sanitarian"	4 00	
Stamps	15 00	
Expressage	1 15	
Telegraphing	75	
Office rent	25 00	
Feb.—Telegraphing	54	
Office rent	25 00	
March—A. P. H. Association, subscription	5 00	
Postage	10 00	
Expressage	3 80	
Engraving stamps	2 60	
Traveling expenses, C. A. Ruggles	9 15	
Post Office box rent	2 00	
Telegrams	3 00	
Postal cards	10 00	
Office rent	25 00	
April—Postal cards	5 00	
Stationery	3 55	
Traveling expenses, J. M. Briceland	27 50	
Traveling expenses, C. A. Ruggles	12 40	
Traveling expenses, R. B. Cole	15 00	
Traveling expenses, H. S. Orme	51 75	
Office rent	25 00	
Traveling expenses, C. A. Ruggles	3 50	
Traveling expenses, C. W. Nutting	48 10	
Traveling expenses, W. G. Cochran	54 00	
Traveling expenses, P. C. Remondino	65 00	
May—N. Eldred, hauling furniture, etc.	5 00	
H. Williams, packing books	2 50	
Postage stamps	14 00	
Official census	2 50	
Expressage	85	
Office rent	25 00	
June—Postage stamps	5 00	
Postage stamps	15 00	
Expressage	3 70	
Office rent	25 00	
Three book cases	23 00	
Total	\$1,733 65	
Balance	69 49	
Total	\$1,803 14	\$1,803 14

STATEMENT OF THE EXPENSES OF THE STATE BOARD OF HEALTH FOR THE FORTY-THIRD
FISCAL YEAR, ENDING JUNE 30, 1892.

Appropriation April 6, 1891		\$1,500 00
July—Traveling expenses of C. A. Ruggles	\$14 40	
Traveling expenses of W. G. Cochran	50 50	
Office rent	25 00	
Overhauling books	2 50	
Stationery, etc.	3 25	
Postage stamps	15 00	
Expressage	2 85	
August—Office rent	25 00	
Postage stamps	10 00	
Expressage	2 25	
Telegraphing	1 65	
Western Union Telegraph Co.	5 43	
Sept.—Office rent	25 00	
Stamps	10 00	
Expressage	50	
Traveling expenses, J. R. Laine	10 60	

October—	Traveling expenses, W. G. Cochran.....	91 80	
	Traveling expenses, C. W. Nutting.....	88 45	
	Traveling expenses, C. A. Ruggles.....	55 05	
	Traveling expenses, J. R. Laine.....	46 85	
	Office rent.....	25 00	
	Postage stamps.....	10 00	
	Postal cards.....	10 00	
	Expressage.....	1 20	
	For typewriting.....	5 00	
Nov.—	Office rent.....	25 00	
	Postage.....	40 00	
	Expressage.....	40	
	Telegrams.....	1 64	
	Glazing.....	75	
	Stationery.....	3 50	
Dec.—	Office rent.....	25 00	
	Postage.....	20 00	
	Expressage.....	50	
1892.			
Jan.—	Expressage.....	1 05	
	Traveling expenses, W. G. Cochran.....	50 50	
	Traveling expenses, C. A. Ruggles.....	14 40	
	Stamps.....	20 00	
	Office rent.....	25 00	
Feb.—	Office rent.....	25 00	
	Postage.....	25 00	
	Subscription "Sanitarian".....	4 05	
	Subscription "Sanitary Record".....	2 80	
	Telegrams.....	35	
	Expressage.....	1 75	
March—	Office rent.....	25 00	
	Postage.....	25 00	
	Expressage.....	50	
April—	Office rent.....	25 00	
	Postage.....	40 00	
	Expressage.....	30	
	Telegraphing.....	40	
	Traveling expenses, C. A. Ruggles.....	33 90	
	Traveling expenses, P. C. Remondino.....	70 00	
	Traveling expenses, W. G. Cochran.....	55 50	
	Traveling expenses, C. W. Nutting.....	53 40	
	Traveling expenses, J. R. Laine.....	24 00	
May—	Traveling expenses, J. R. Laine.....	44 45	
	Traveling expenses, W. G. Cochran.....	5 45	
	Traveling expenses, P. C. Remondino.....	28 00	
	Traveling expenses, C. A. Ruggles.....	70 20	
	Office rent for May.....	25 00	
	Postage.....	40 00	
	Postal cards.....	45 00	
June—	Office rent.....	25 00	
	Postage stamps.....	10 00	
	Statutes, 1891.....	2 50	
	H. S. Crocker, Codes and scales.....	19 00	
	Total.....	\$1,491 17	
	Balance.....	8 83	
	Total.....	\$1,500 00	\$1,500 00

EXPENSES OF THE STATE BOARD OF HEALTH ON ACCOUNT OF CONTAGIOUS AND INFECTIOUS DISEASES FOR THE FORTY-SECOND AND FORTY-THIRD FISCAL YEARS.

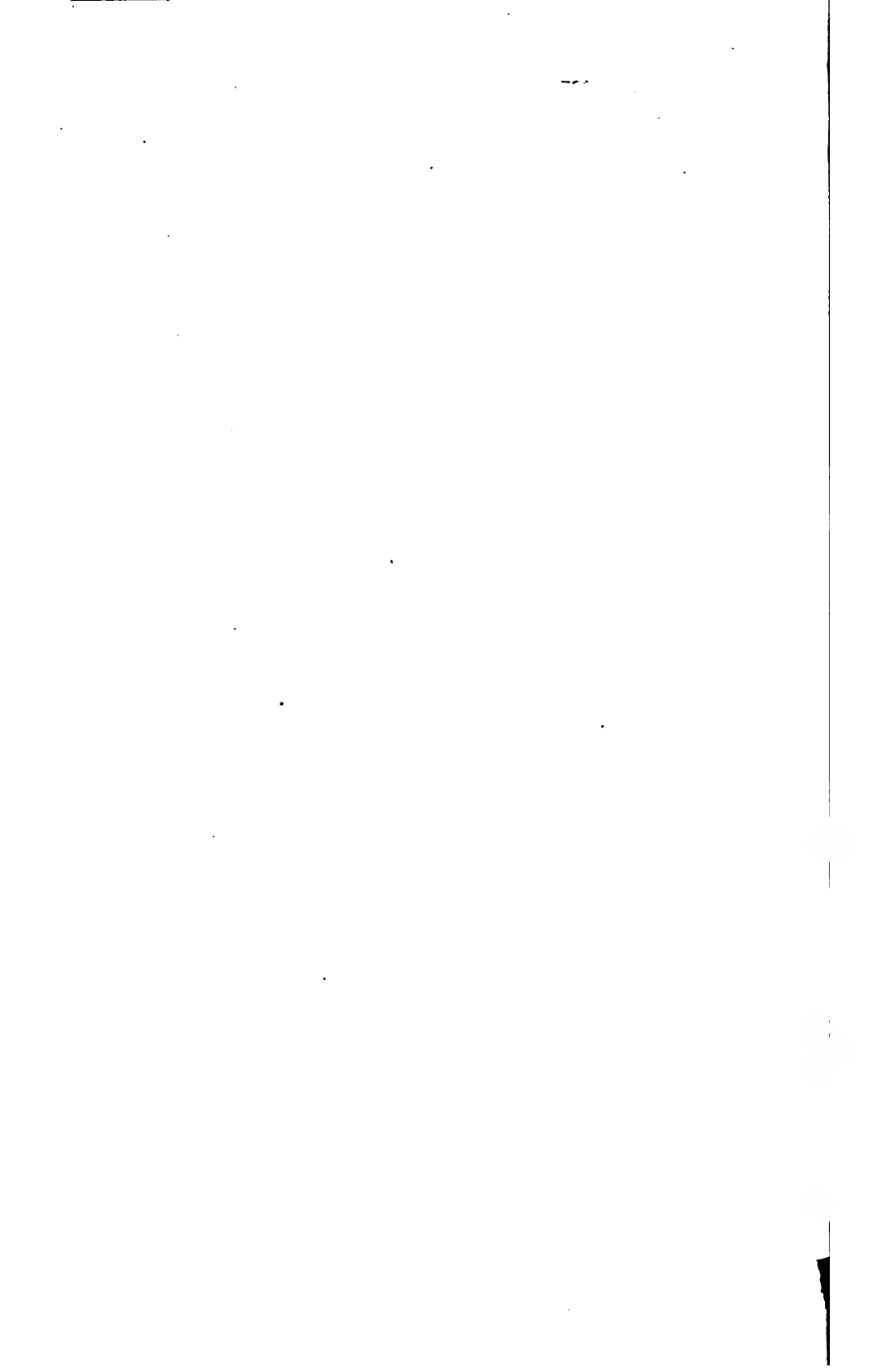
1890.			
July 1—	Unexpended balance in appropriation.....		\$5,982 45
1892.			
April 12—	Traveling expenses, P. C. Remondino.....	\$250 00	
	Balance.....	5,732 45	
	Total.....	\$5,982 45	\$5,982 45

Choler
Choler
Diarrh
Smallp
Measle
Scarlat
Diphth
Croup
Influe
Whoop
Erysip
Fevers

Syphil
Alcohol
Hydro
Tuberc
Phthis
Maras
Scroful
Rheum
Cancer
Pneum
Pleuris
Bronch
Other
Enter
Gastric
Gastro
Periton
Disease
Other
Bright
Aneur
Heart
Convul
Other
Puerper
Old age
Suicide
Heat,
All other
Stillborn

Total

* R



PREVENTIVE DISEASE CIRCULARS.

DIPHTHERIA; ITS RESTRICTION AND PREVENTION.

USEFUL INFORMATION PUBLISHED FOR GENERAL DISTRIBUTION.

[CIRCULAR No. 1.]

Diphtheria is so frequently malignant and fatal in its effects that the State Board of Health, in the exercise of its functions in the restriction and prevention of disease, deems it necessary to furnish the public with information with reference to the manner of its propagation, coupled with such suggestions concerning the best known methods of limiting its progress as any person of average intelligence may easily put to practical use.

It should be generally understood that diphtheria is a contagious and infectious disease, which attacks by preference the young, and especially those whose vital resistance has been reduced by exposure to filth, uncleanness, the emanations from sewers, drains, and all unsanitary influences.

HOW DIPHTHERIA IS CONTRACTED.

The infectious substance of diphtheria is conveyed from the mouth, nose, air passages, and discharges from the bowels of those who have the disease. It is believed, with some reason, that the perspiration and urine may contain it. Domestic animals, such as cats, dogs, chickens, and tame pigeons are credited with carrying the disease from one person to another, either by having the disease themselves, or because of having been handled by persons who were afflicted with it. It may be transmitted in water, milk, or other liquids, or in food or clothing, or by kissing a person who has a sore throat, without suspicion that it is diphtheria.

The secretions of the mouth and nose of a diphtheritic patient, mixed, as they must necessarily be, with the exudative deposit, are often allowed to fall upon the bedclothes and carpets, where they dry and remain for an indefinite length of time. These are liable to be detached by the friction of the fabric, or the shuffling of feet upon the floor, when the poison rises as dust in fine particles, and lodges in throat, nose, windpipe, or stomach of the person who may respire the air so contaminated.

Some persons have so much vital resistance to disease that it does not take root and develop. Others, however, have the susceptibility to its growth and fatal effects.

It should be remembered that a malignant form of the disease may be contracted from a person having it in a very mild form.

Exposure to an atmosphere contaminated by the body of a person who has died of diphtheria is extremely dangerous.

RULES AND PRECAUTIONS TO BE OBSERVED BY ALL WHO COME IN CONTACT WITH DIPHTHERIA.

1. Whenever diphtheria is known to be in the neighborhood, all children with sore throats should be kept apart from other children until a competent physician has determined that the sore throat is not diphtheria.

2. A person with diphtheria should be placed in a room in the upper story of the house, if convenient, as remote as possible from direct communication with others, and access should be denied to all but the necessary attendants. All superfluous furniture, including carpets, curtains, clothing, and books, should be removed from the apartment. There should be free ventilation without drafts.

3. A card with DIPHTHERIA printed in large type should be placed in a conspicuous position on the house, and no child should be allowed to enter.

4. No food or drink that has been exposed to the atmosphere of the sick-room should be used by well persons, and the dishes used in the sick-room should be washed separately.

5. Neither the bedclothes nor the patient's body linen should be mixed with other soiled clothes or admitted to the general wash until they are first disinfected.

6. No person recently recovered from diphtheria should attend school, church, or other public assemblies, until declared by a competent physician to be no longer capable of transmitting the contagion.

7. Under no circumstances should a public funeral be held of a person dead of diphtheria. Neither must children be permitted to attend. Upon this point health officials cannot be too firm and unyielding. All personal considerations and sentiment must be subordinated to considerations of public safety.

The importance of this course should be explained by the medical profession to clergymen of all denominations, and their influence and coöperation earnestly solicited, in order that the objections and prejudices of the careless and uninformed may be more easily overcome.

DISINFECTION.

As the discharges from the nose and throat are highly contagious, they should be received on cloths, which should be immediately burned. The urine, vomited matter, and discharges from the bowels should be received in a vessel containing a solution of chloride of lime in the proportion of six or eight or more tablespoonfuls in a gallon of soft water. They should be allowed to remain in this solution at least fifteen minutes before being deposited in a privy vault or water-closet.

DISINFECTION OF CLOTHING AND PREMISES.

The soiled linen, clothing, and towels should, if possible, be boiled in hot water for thirty minutes before leaving the room; but if this be inconvenient, a solution of sulphate of zinc (white vitriol) should be made by dissolving half a pound of the zinc with six tablespoonfuls of common table salt in a gallon of water, in which the clothes should be soaked two hours before being washed.

Some physicians may recommend solutions of sulphate of iron (green copperas) instead of a solution of chloride of lime, and a solution of corrosive sublimate or carbolic acid instead of sulphate of zinc.

It has been demonstrated, however, that copperas is not properly a *disinfectant*. It is an excellent antiseptic, arresting putrefactive decomposition, but it does not destroy the vitality of disease germs or the infecting power of materials containing them.

Corrosive sublimate solutions are poisonous, and when used should be kept in earthen, glass, or wooden vessels, and should invariably be labeled POISON.

Carbolic acid is also poisonous, and, like chloride of lime, is sometimes objectionable on account of its odor.

The chloride of lime solution for the secretions and dejections of the body, and the zinc solution for the clothes and linen, will, perhaps, be the most economical and easily obtained for general use, and will prove sufficient and satisfactory. The use of any of these agents must be determined by the attending physician.

The attendants should observe scrupulous cleanliness of hands and clothing. They should not appear in public until after having first changed their clothes and otherwise removed all possibility of carrying the contagion.

In case of death, let the body be wrapped in a sheet which has been soaked in the zinc solution, and incased in a tight coffin. The interment should be private, and in no case should the remains be exposed to view.

The room which has been occupied by the sick should, after death or recovery, be effectively disinfected.

Articles which cannot be washed or boiled should be exposed to dry heat at a temperature of 230° Fahrenheit for three or four hours, the articles being freely exposed and not folded or piled up. Otherwise, the room and its contents must be fumigated by the fumes of burning sulphur.

FUMIGATION WITH SULPHUR is performed by first closing doors and windows and all apertures through which the gas might escape. Then the floors, walls, and furniture must be thoroughly dampened. For a room ten feet square, three pounds of sulphur, in fragments, are placed in an iron pan supported by bricks placed in a tub containing a few inches of water. The sulphur is then moistened with alcohol and set on fire. When well ignited, shut the door and keep the room tightly closed several hours: When sufficiently fumigated, open the room freely to the air until thoroughly ventilated, when it will again be fit for occupancy.

In addition to these precautions the cellars, privies, water-closets, cess-pools, drains, sewers, and all other probable sources of filth, should be cleansed and treated to a solution of copperas. Stagnant water should be drained. Let the sunshine into the rooms of the houses, and remember that pure water, pure air, and sunshine are the greatest natural preventives of contagious diseases.

These, in short, are the rules most generally adopted in the restriction of this destroyer of the young. They are as briefly stated as may be consistent with clearness, for there must be a comprehension of their scope and purport in order to exercise that influence and good which is the object to be attained.

Much more might be added, but this would lead to the consideration of medical subjects not deemed essential in directions for the guidance of the general public.

For information concerning the treatment of diphtheria it is necessary to look to the attending physician. He should supply you with this or some other pamphlet containing like information, which few busy practitioners have the leisure to verbally explain, and which few persons would be likely to remember.

The foregoing methods, modified by the attending physician to meet the exigency of the case, may be employed in all contagious diseases.

In order to effect the good which it is intended this pamphlet should accomplish, it should be given a wide distribution. It should either be preserved for possible future use, or should be sent to friends and neighbors who have need of such information in their distress.

Copies may be procured for free distribution by applying to the Secretary of the State Board of Health, Sacramento.

By order of the State Board of Health.

THE DANGERS ARISING FROM PUBLIC FUNERALS OF THOSE WHO HAVE DIED FROM CONTAGIOUS AND INFECTIOUS DISEASES.

Addressed to the Clerical Profession.

[CIRCULAR NO. 2.]

The State Board of Health of California, realizing fully the benign influence of the reverend clergy of the State, and having a high appreciation of their functions as leaders and teachers of the people, would especially invoke their influence and coöperation in the instruction of the public in the principles of health and its preservation. Because of their general intelligence and widespread professional influence, they can exert greater *personal* influence than any other class or profession. Their visits are always missions of consolation and mercy. Unlike other professions, these duties are performed without fee or reward. There is thus engendered a confidential reverence for those so forgetful of self as to be ready at any and all times to speak words of hope, courage, and trust, when light has departed from the household and despair sits perched upon the family altar.

It may be superfluous to call the attention of so intelligent a class of men to a subject on which nearly all may have formed well-defined opinions; but having in mind the closeness of the pastoral relation to human life, the social standing of families, and the reciprocal feeling among friends and neighbors, it is deemed necessary to reinforce their convictions of what it is proper to do, by the conversion of such convictions into custom and law.

The Board, therefore, respectfully asks the attention of ministers of all denominations and of every order to the practice of holding public funerals of persons who have died of contagious or infectious diseases. In many cities and towns there exists a municipal regulation or ordinance prohibiting a public or church funeral of any person who has died of Asiatic cholera, smallpox, typhus fever, diphtheria, yellow fever, scarlet fever, or measles, and directing the family of deceased to limit the attendance to as few as possible, and to take all precautions to pre-

vent the exposure of other persons to contagion or infection. The person authorizing the public notice of death is also required to publish the name of the disease which caused the death of the person whose funeral is to be held. Where such local regulations are in force the clergy are relieved from the painful duty of refusal to perform such services.

Many amiable and otherwise well-informed people will importune the minister to officiate at a public funeral of a precious child that has died of diphtheria or scarlet fever. They cannot or will not understand that a compliance with the request endangers not only the lives of those present, but the lives also of the children of the kind pastor, who would not inflict pain by refusing, and of the children of sorrowing friends who inspect the remains in the casket, and follow them to the grave. It is to prevent such consequences that the suggestion is made that those of the clergy who live in cities and towns should so use their influence with the municipal authorities as to induce them to adopt an ordinance restraining any one from officiating at a public funeral in case of death from contagious diseases.

It is believed that considerations of personal and public safety need not be urged in support of the vital necessity of such action when addressing the clerical profession. If it were necessary to cite authorities to convince them that contagious diseases may be communicated by exhalations from the bodies of the dead, as well as by contact with living persons afflicted with the disease, they could be furnished without number. This would be the universal testimony of medical men. But it is considered unnecessary to furnish and multiply instances of infection and fatal results arising from public funerals in the case of contagious diseases. The principal thing is to refuse to hold such public services, no matter what the social standing of the family of deceased may be. Objections may arise to what at first may appear to be an extreme course. There is planted deep in the human heart a desire to honor the dead, and there are unfortunately many who think this can best be shown by a public funeral. They believe that to neglect public funeral rites is to manifest a lack of proper regard for the memory of the dead.

At this moment, when an atmosphere of sorrow and gloom pervades the home, considerations of safety for the living are apt to be received with indifference and contempt. Whatever is said to the bereaved relatives at such a time, must be spoken with the utmost gentleness. But they must be instructed as to the duty of subordinating their wish to honor the dead, to the duty of preserving the health and lives of the living. It is believed that most persons will yield in this matter if properly advised. But if any are unreasonable, and insist upon public funeral rites with an apparent disregard for the safety of others, the police power of the municipality or the State should be invoked to teach such persons that it is a high moral duty to forego their preference, and to subordinate their individual desires that the welfare of the community may be conserved. Fortunately, in California, sanitary legislation has been such as to invest cities, towns, and sanitary districts with all the powers needed for the protection of their respective localities. But as all know, such laws depend in a great measure upon public opinion for their enforcement. The sentiment of the community must be taken into account, and as the affairs of funerals have been almost entirely delegated to the church, ministers of the gospel stand in a position to

explain to the people how it is possible to manifest proper and fitting respect for the dead without disregard for, and danger to, the living. Not only should it be explained that it may be contrary to law, but that it is also thoughtless and selfish for the members of one family to insist that persons from many other homes shall be subjected to the danger of infection, in order that a public funeral service may be held over the unconscious remains of one who can neither be benefited by it nor injured by its omission. The clerical and medical professions agree on all important questions relating to the preservation of human life and the betterment of humanity. It is certainly desirable that the two professions that have to deal with the hopes and fears, the joys and sorrows, the life and death of mankind, as an inseparable function of their office, should enjoy each other's confidence and earnest coöperation in any measure calculated to ameliorate the condition of the human race.

It is sincerely hoped that the sentiments herein contained will meet the approval of those to whom this is addressed.

By order of the State Board of Health.

THE DANGERS ARISING FROM TAKING OFF THE HAT OUT OF DOORS DURING FUNERAL SERVICES.

Addressed to the Clerical Profession and Officers of Secret, Fraternal, and Beneficiary Societies of California.

[CIRCULAR No. 3.]

The frequency of reported cases of severe illness, and sometimes death, traceable to the removal of the hat at funerals, has determined the California State Board of Health to address the reverend clergy and the officers of secret, fraternal, and beneficiary societies throughout the State, respectfully directing their attention to the serious consequences which not infrequently follow the observance of the custom during the prevalence of inclement weather or under the rays of a hot summer sun.

The hat is used as a covering for the head. In an infinite variety of shapes and patterns the hat or cap has been worn from times of remote antiquity. In its various forms it has been known under different names, and adopted by some nations as a symbol. The most ancient form is the cap, such as is seen in figures representing the goddess of liberty. The Grecian *pileus* was a woolen cap sometimes worn as a lining to the helmet. The aged and infirm Romans wore caps of the same material for warmth. When conical, the cap was the *apex* of the Roman priests, worn probably from the time of Numa. With the elevated crest pointed forward, like the liberty cap, it was the Phrygian or Mysian bonnet. With a brim it became the *petasus*, a hat much like the round felt hats now worn. Among the Romans the cap was a symbol of liberty, and slaves were presented with one on receiving their freedom. In modern times it has been a conspicuous article of dress, and has been adorned with showy plumes, jewels, and rosettes. It has also been worn as a mark of authority, and its shape and ornamentation have frequently made it an insignia of rank and station. Its form, and sometimes its color, has been made to designate the rank and character of its wearer, as the monarch, by his crown; the cardinal, by his red hat, betokening his readiness to spill his blood for the sake of the

Savior; and the court fool, with his cap and a bell. In one form it serves to distinguish the military officer, and in another the peaceful Quaker. The wearing of a hat as an article of apparel is an almost universal custom. There must underlie the wearing of a covering for the head a deeper significance than a mere conformity with the prevailing fashion.

The spectacle of an adult person walking the streets or country roads, or laboring in the open air, without wearing a hat, would excite comment everywhere. Doubts of the mental soundness of the person would be freely expressed. The custom of hat wearing arose from necessity. Every one will acknowledge the warmth and comfort of a fur or woollen cap or hat in cold and stormy weather. The fashion of wearing the hair short increases the need of an artificial protection to the head, while to those who are bald it is indispensable to the preservation of good bodily health. Nurses often find it necessary to put a flannel bonnet on the heads of young infants before they can be cured of cold in the head and nostrils. A foundation for chronic nasal catarrh is one of the results of repeated colds during infant and child life.

Not one man in a thousand goes out of doors ten minutes of the day without taking the precaution to put on a hat. Experience has taught him that a neglect to do so may bring on a fit of sneezing, a watery suffusion of the eyes, a sore throat, headache, earache, neuralgia, toothache, and symptoms of a cold, with fever, a cough, and perhaps, pneumonia. So fully is this recognized in Europe that the custom of saluting ladies and friends by lifting the hat has been of late years greatly superseded by the wave of the hand, or half military salute.

Since the prevalence of la grippe, the risk of out-door exposure has multiplied. Many cases of severe illness, and not a few deaths have been noted from this cause. The most common occasions of danger have been during attendance on funerals, either as pall-bearers or mourners. In well-conducted funerals undertakers nowadays frequently furnish skull caps to be worn by pall-bearers. The skull cap, although it has no visor to protect the eyes, is nevertheless an efficient covering, does not offend our sensibilities, and implies no want of respect for the dead. The minister and the mourners may also be furnished with skull caps. There need be no discrimination in favor of the pall-bearers. But all reflecting persons will agree that it requires a stretch of the imagination to detect the difference in the effect between the wearing of an ordinary hat and the wearing of a skull cap on such occasions. Baring the head at funerals is a mere convention that serves no useful ceremonious purpose. Wearing a skull cap is no compromise; it is a surrender. The custom of taking off the hat in wet or cold and stormy weather while the remains are carried from the home to the hearse, or from the hearse to the chapel or lodge-room, and again when the last sad rites are performed at the grave, is fraught with danger. Ten, fifteen, and twenty minutes are not infrequently consumed, during which pall-bearers and mourners remain uncovered, while a chill wind, laden with damp, diminishes the vital resistance of the weak, and lays the foundation for a decline. The recently sick, the aged and infirm, and those who have lost the hair of the head, are in the greatest danger. But none are exempt. There are but few who, in the absence of suggestion, will defy the almost universal custom of Christian nations to uncover in the presence of the dead. Their sentiments of love, honor, and respect for the dead impel them to disregard the danger

involved by the exposure, notwithstanding a full comprehension of its evil import.

It is on such occasions that the intelligent and masterful influence of the ministry and chief officers of lodges and societies having the burial in charge may be exercised in the beneficent advice to remain covered, and avoid discomfort and danger. This can be done with neither injury nor disrespect to the dead, but with great kindness and benefit to the living. Speaking with authority, and themselves setting the example by remaining covered, they administer comfort, relief, and protection, and with certainty lessen apprehension for the results of the necessary exposure incidental to the interment.

A desire to live to a fullness of years is instinctive in all men. It is believed that the pursuance of the course herein indicated will not only be the means of preventing much sickness, but may be the means of preserving many useful lives. That the efforts to prevent disease shall at least equal, if it does not exceed, the art of cure, is one of the possible triumphs of modern civilization.

By order of the State Board of Health.

REPORT OF STATE ANALYST.

The Act creating the office of State Analyst, and defining his duties, was intended to provide a way for accomplishing the following ends :

I. An official analysis (made with the greatest care) of the mineral waters of this State.

II. A most careful investigation of the drinking waters of the State, as supplied to the larger towns and cities, and to its public institutions.

III. An examination of the food products of the State, including milk and ordinary foods.

IV. An examination of drugs, medicines, etc., for strength and purity.

V. An examination of the wines produced in the State and others offered for sale in the State, and to do such other work as the State Board of Viticulture may desire.

VI. To examine such ores, minerals, etc., as the Mining Bureau may desire.

And finally, the State Analyst was made the Chemist of the State, subject to the call of several of its important Boards, either for information, advice, or chemical analysis.

The Boards specifically mentioned were the State Board of Health, the State Board of Viticultural Commissioners, and the State Mining Bureau, to which might with propriety be added the State Board of Horticulture.

If the office of State Analyst was supported and maintained as the Organic Act contemplated, the State Board of Health would find its field for usefulness very much enlarged.

No argument need be offered in support of the regular official examination of drinking waters of the State. It is known to every person that there is no other channel through which so many disease germs enter the body. Contaminated drinking water carries disease and death to unsuspecting and helpless persons. The weak, the young, the invalid, the convalescent are the first to suffer from its concealed poison. The water may be clear and palatable, and have all the appearance of purity, and yet be injurious to health. The individual is entirely powerless to avert its evil effects. It is clearly the duty of the State to protect him in his health, and against the insidious attacks of unseen foes.

This work is being begun in a more or less efficient manner in other States. I shall make special mention of Massachusetts, because this State has inaugurated a system of good inspection, and carefully carried it into operation. The Legislature of that State has appropriated annually, for a score of years, \$5,000 to the State Board of Health, for the examination of the milk, food, and water supply, etc., of the State.

That State has done more than this. It has, within the last five years, expended \$100,000 in the special investigation of the water supply of the State. The improved sanitary condition of the State is the return for this expenditure. Massachusetts is not a State given to lavish

expenditure without reason, yet intelligent enough to know a good investment. The milk supply was improved in quality almost immediately upon the passage of the law creating and providing for a milk inspection. Year by year the reports of the Board of Health show continued improvement. There are fewer cases of suspected adulteration, and the analysis shows a smaller and smaller amount of adulteration in the samples examined. The legislation already enacted in this State makes it easy to inaugurate such a food inspection as is maintained in Massachusetts.

It is generally admitted that California has within its borders a large number and a large variety of mineral springs. These are located in wild, out-of-the-way places, and no development of these springs is possible until an analysis has demonstrated their value. The mineral springs of Germany were first examined at the State's expense, and a fund is set aside for the analysis of mineral waters within the limits of the State. Our own people visit the mineral springs of other countries, and spend large sums of money abroad, when, beyond all question, we have equally curative waters at home. For every dollar spent in this investigation of the mineral springs of the State a hundred dollars would be saved. If, added to the attractions of climate, we offer the proofs of the great value of our mineral waters, then we would attract many health-seekers who are not drawn here by climate alone. California can become the great sanitarium of the world. Too much cannot be said of the importance of the work placed upon the State Analyst. Experience has shown that nowhere can food inspection be made efficient if the State does not provide for a free analysis, and also for a systematic inspection of the same, and collection of samples.

The University of California has constructed a large, convenient, and well-equipped chemical laboratory. Provision has been made in it for the work that would fall to the State Analyst, so that it would be very easy for the State to take up this work and carry it forward with efficiency. The additional burden upon the State would not be felt. No man, woman, or child in the State, no taxpayer, would ever know or feel that this work was a burden to him. On the other hand, thousands upon thousands of the common people would be benefited by protection from disease germs, whether conveyed in water, milk, or other substances.

In view of the importance of the work to be done for the people of the State, and also in view of the small cost to the State, it is hoped that the incoming Legislature will see its way to make provision for the maintenance of the office of State Analyst.

Respectfully submitted.

W. B. RISING,
State Analyst.

RECOMMENDATION MADE BY THE STATE BOARD OF HEALTH.

The foregoing report of the State Analyst was received after the Biennial Report of the State Board of Health had been sent to the State Printer, which prevented the making of a recommendation with reference to an appropriation sufficient to meet his requirements.

The Secretary has on several occasions forwarded to Berkeley samples of water and other substances received from different parts of the State, to be analyzed and reported upon. The receipt of the packages was in every instance acknowledged by the courteous State Analyst, with the statement that it would be impracticable for him to comply with the request, inasmuch as his duties would not permit him to do it personally, and, further, that the State had made no provision for the employment of assistants. This has rendered the office of the State Analyst, so far as the State Board of Health is concerned, a nullity.

The law directs that the State Analyst shall make analyses of waters and substances sent to him by the State Board of Health, but, as it seems, no appropriation has been made wherewith it could be done. It is certainly necessary that the office of the State Analyst shall be something more than a name; and it may be necessary, in case cholera should reach our State during the next summer, to utilize the well-equipped chemical laboratory of the State University, by submitting to the State Analyst the contents of human viscera of persons suspected of having died of cholera, or of poisons administered with criminal intent during the prevalence of cholera.

This, in addition to the considerations embodied in his report, should be sufficient to show the necessity of an appropriation sufficient to meet the requirements of the State Analyst.

For this purpose, the State Board of Health would respectfully recommend that the Legislature shall appropriate \$1,500 per year for the next two years.

DIPHTHERIA; ITS COMMUNICABILITY AND PREVENTION.

By C. A. RUGGLES, M.D.

An experience of many years in sanitary matters has brought me, reluctantly, to the conclusion that great ignorance pervades the public mind regarding the origin, communicability, and prevention of disease. The existence of that ignorance is almost inexcusable, for it is plainly the duty of State and local Boards of Health to so instruct the people, so educate the public mind, that it can duly and clearly appreciate the great blessing of health and how to preserve it. In consideration of the above-stated condition, I have thought proper to present for public thought a few practical points in relation to diphtheria, which has for the past year been unusually prevalent in many parts of the State. Microscopic investigation has demonstrated beyond a reasonable doubt, that the pathognomonic feature of diphtheria, invariably present, is the specific micro-organism known as the Kleb-Loeffler bacillus.

The researches of Kleb, Loeffler, and others have abundantly proved that this bacillus is the causative agent of diphtheria, and that it produces, at the point of infection, a chemical poison whose absorption into the circulation gives rise to important symptoms. The mind of the profession has been much disturbed by the difference of opinion as to whether this disease is local or constitutional. It is at the present time almost, if not quite, universally admitted that it is, at its very outset, entirely local, and the sooner medical men come to that conclusion, and instruct their patrons as to that fact, and the sooner the disease is discovered and proper treatment applied, the better will be the prospect of saving the unfortunate patient. Though particular or specific plans of treatment are not the object of this article, yet all treatment should be based upon this one fundamental fact, that diphtheria is a local, specific disease, due to the presence and action of bacilli, characterized by a deposit of pseudo-membrane at the site of infection, accompanied by constitutional disturbances and followed by nervous symptoms due to the absorption into the circulation of a virulent agent, tox-albumin, which is produced by the local development of the bacilli. To treat diphtheria understandingly and successfully, the medical attendant must be prepared to admit that the disease is local, and the treatment should be of a local-topical character at first, for, according to the best authorities on this subject, the bacilli develop only locally at the site of infection, and are found in the pseudo-membrane only, mostly on the surface, not even in the subjacent mucous membrane. They do not invade the tissues or circulation, but generate at the point of infection this highly poisonous substance, the absorption of which produces the constitutional disturbance. If these views respecting the nature of this disease are correct, and the consensus of medical opinion is that they are, it seems as if vigorous local treatment is indicated to destroy the bacilli and prevent as far as possible the formation and absorption of

the tox-albumin. This plan of procedure is mentioned simply to forcibly impress on the public mind the great necessity of early application of treatment. When it is fully understood that the pathological element of this disease is the bacillus in the exudation, it will be readily conceded that it is communicable; that it is highly contagious, equally so as smallpox, and much more fatal in its results, as mortuary statistics show that there are ten times as many deaths from diphtheria as from smallpox. We can control smallpox by vaccination, which we cannot do with diphtheria. When the people will consent to be quarantined, and as cheerfully isolate and guard against it as against smallpox, then much will have been gained towards its prevention.

The contagiousness or communicability of this disease is now almost universally conceded by all medical men; possibly excepting a very few of questionable respectability, whose advice and counsel have done much to hinder and obstruct the efforts of Health Officers to control it, by destroying that confidence that should always exist between the people and sanitary authorities. If it is not contagious, then, they say all efforts to suppress it are unnecessarily rigid and arbitrary. One more point that I wish to forcibly impress on the public mind: That is that for sanitary purposes, at least, diphtheria and membranous croup are identical. Innumerable instances could be cited where croup diagnosed as such, treated as such, and tracheotomy performed for its relief, has given to children exposed to it, unmistakable diphtheria. My opinion is that physicians should be obliged to report their cases of croup to the local health authorities in the same manner as any other contagious disease. The public should be instructed up to the knowledge of the necessity of being just as careful in the management of a slight case as of one more severe, as it is possible for a very bad case to arise from a very mild one. Diphtheria attacks all ages. It exempts neither the nursing babe nor the adult. It appears more disposed to attack scrofulous children and those with large prominent tonsils and enlarged cervical glands, as they offer a larger field for the lodgment of the bacillus. It having been clearly demonstrated by microscopical research that the pathological feature of this disease is the Kleb-Loeffler bacillus, and that it develops locally only at the point of infection, it would seem our duty to tell parents to early and carefully examine the throats of their little ones, and if an unusual redness of the tonsils and pharynx be found, which may soon be followed by the development of a thin yellowish membrane or exudation, it is very good practice to resort thus early to medical treatment. Call your family physician early, believing that by attacking the disease thus in its early stage with the proper germicides before the generation at the point of entrance of the highly poisonous substance, the absorption of which produces the constitutional symptoms, much will be gained.

The suspicions of the parents having been verified by the medical attendant and the Health Officer, the most important duty of the sanitary department commences in using every known means of prevention. The strict quarantine of the whole family, children and adults, is in my opinion the only successful measure to stamp it out. In every community are people ignorant about sanitary and hygienic measures, who are not willing to undergo any individual inconvenience for the sake of improving their sanitary condition and lessen sickness and death among them. Where the welfare of the community is at stake,

individual hardships should not be considered, and the cry of violation of individual rights should not be heeded. Why should diphtheria not be as strictly quarantined as smallpox? It is in many instances difficult to carry out strict quarantine, but a Health Officer who, as a celebrated sanitarian aptly remarked, is not afraid to be cursed and sworn at daily by his profane neighbor, can, with the aid of the proper authorities, accomplish it easily enough. After proper external quarantine measures have been instituted to protect the community, we should put in force regulations for the better protection of those confined in the house with the sick one. There is no question as to the contagiousness of this disease, and it can safely be laid down as a sanitary axiom that whatever is communicable is preventable. Now, our whole aim and purpose should be to prevent it spreading. The one thing important and absolutely necessary to accomplish that end is complete and thorough isolation. A large, airy room should be selected, preferably at the top of the house and on the sunny side. An open fireplace is an advantage to perfect ventilation. Carpets, curtains, mats, and ornaments, in fact all unnecessary furniture, should be removed. A special attendant should be selected, and none other should be allowed in the sick-room. Dishes, towels, clothing, bedding, and utensils used in the room should remain there, and not be allowed to enter any other part of the house. Clothing of the cheapest kind only should be used around the patient, so that it can be burned without unnecessary hardship to parents. Soiled clothes that are worth saving should be immediately placed in a bichloride of mercury bath and thoroughly disinfected. The discharges from the nose or mouth should be received on old pieces of cloth and immediately burned. The excreta should be received in glazed-ware vessels containing the bichloride mixture. Cats and dogs should not be allowed in the room, for they are often the means of spreading infection.

The sanitary condition of closets, sinks, traps, and pipes should be closely examined and rectified if defective. The more particular and precise we are in these arrangements the more perfect will be the isolation, and consequently the safety of other members of the family the better secured. The infective bacilli being present in particles of the exudation which are coughed, sneezed, or spat up and in the saliva and mucus from the nose, readily attach themselves to the clothing of the patient or the attendants, to the walls, furniture, bedding, books, dishes, papers, or may become dry and float in the dust and air of the room; therefore, the necessity of perfect and thorough methods of disinfection, aiming at nothing short of destruction of the bacilli, is very clear. When the attending physician and the Health Officer are perfectly satisfied as to the complete recovery of the patient, it may be bathed with a weak solution of bichloride of mercury, particularly the hair, and in a clean suit of clothing may be allowed its liberty. The room in which the sick one was confined should be tightly closed and thoroughly fumigated with sulphur fumes.

It is advisable to saturate the air of the room with steam while the sulphur is burning. About five pounds of sulphur to one thousand two hundred cubic feet of air space is sufficient; the room to remain closed for six or eight hours. Then the floors, the bedstead, and all woodwork in the room to be washed with the bichloride of mercury wash, about one ounce to five buckets of water; wallpaper to be renewed and woodwork to

be repainted. It has been satisfactorily demonstrated by numerous experiments by scientists that unless there is a certain saturation of the air in the room to be disinfected, the sulphur fumes alone are useless. If you stop short of that degree you have not disinfected the room; you have simply subjected the germs to a high temporary inconvenience and left them to recover in a short time. When diphtheria is present we are frequently asked is there any way adopted to diminish the risk of infection? When one member of the family is affected, as before stated, complete isolation should be enforced at once, and parents should be very urgently warned of the danger of fondling, petting, and most particularly of kissing the sick one; as many of the family as possible, especially the children, should be sent away. If this cannot be done, a careful daily inspection of the mouth and throat should be made. Chlorate of potash gargles and tablets should be freely used to keep the secretions of mouth and throat healthy. The period of incubation is stated by many authorities to be about eight days; therefore, I would always insist that the quarantine should not be raised until the eight days have expired.

Notice of the sickness should be sent to the Superintendent of Schools, so that certainly no one from that family should be admitted until provided with a certificate from the Health Officer, who should not issue it for at least two weeks after the discharge of the family from quarantine. In case of death the funeral should be strictly private, the body of deceased being wrapped in cloths soaked in bichloride of mercury solution and placed in an hermetically sealed casket. In presenting these few practical ideas, divested as much as possible of scientific and technical phrases, to the public, it may appear strange for me to make a suggestion or give advice to medical gentlemen, but I think it well to show up the great inconsistency of some physicians who will well and truly explain to the parents of the sick one the great necessity of being very careful, so that the disease may not be communicated to others of the family; who will learnedly and very scientifically talk about the easy lodgment of the diphtheritic bacillus on articles of clothing and furniture, and tell how tenacious of life these germs are, how long they remain active, for four, five, and six months, and yet after that learned dissertation, and after having applied topically his germicides during much struggling of the patient, who coughs and spits out pieces of exudation on the hands and clothing of the doctor, will leave that patient, and, without any disinfection, or the least idea of doing wrong, visit his own family and children, or the family and children of his patrons. What better medium of communication could be desired? My opinion is that such conduct is culpable, as well as inconsistent. He should thoroughly disinfect with the best known means, and take no risks as to himself spreading the disease.

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VENTILATION AND FOUL AIR AS SOCIOLOGICAL FACTORS OR MODIFIERS.

By P. C. REMONDINO, M.D.

To most persons the subject of "climate" conveys but the most indistinct and undefined idea. They are too apt to look upon "climate" as a corporate, distinct, individualized, and constant element, possessing distinct and varied specific properties, made so by what are generally considered climatic factorial elements, to wit: longitude, latitude, altitude, and surrounding physical geography. This is all very well as far as it goes, but as observed by a British author, there is a broader view, in which we must observe the subject of "climate." In touching upon the subject, he says: "In what has been said, it has been repeatedly hinted that narrow views may exist as to what goes to form *climate*, and that there may be misunderstandings regarding some of its constituents. Temperature, pressure, moisture, motion, etc., are never forgotten, though often very unintelligently considered; but there are many to whom it never occurs that there may be a *chemistry of climate*, and that airs may differ not only in such things as heat and moisture, but in the proportions of oxygen, nitrogen, and carbonic acid which they contain, as well as in the presence in them of special substances, either held in solution or in mechanical suspension. That such is probably the case, every one is ready to admit, yet practically in works on medical-climatology air is just air all the world over. It is true that for many years back experimentalists have labored to show that there are airs and airs as well as dukes and dukes; but still, even at so late a time as in the last years of his life, Dalton said that chemical experiment could not distinguish the air of Manchester from the air of Helvellyn, and it must be remembered that Dalton was equally distinguished as a chemist and as a meteorologist. Cavendish, too, could not decide that the air of London differed chemically from that of the country. Dalton was far wrong, however, as is clearly shown by his distinguished pupil, Dr. R. Angus Smith, in his recent work on 'Air and Rain.' Dr. Smith, we think, originated the phrase '*chemistry of climate*,' and in this work he gives us an extraordinary contribution of facts to the phrase."

To the ordinary observer, the labors of Dr. Smith have but little significance; but this able pioneer, in a field of science that has since been well surveyed, was actually analyzing and investigating elements which, in their presence, as to quantity and intensity, are actually the most potent sociological factors imaginable. How these elements can so act as to demoralize man and convert human beings into brutes, drunkards, prostitutes, and depraved beings generally, and how the opposite conditions can reclaim him, is the object of the following pages.

Nothing in the field of study will so show the homogeneous origin of many etiological factors of disease, sociological conditions, and many

anthropological traits, as the following of the paths of investigation marked out and first trod by Dr. Smith, and no branch of science is more broadly applicable to the amelioration of mankind. It is well to show the utter folly of attempting to treat the mental, moral, and physical natures of man from separate and differently sustaining points, because we have, more than from any other point of observation, observed the close and intimate, as well as inseparable relations, that exist between these natures of mankind, at the same time that we have seen the indestructible interdependence that we must well understand—an interdependence that unfortunately is but little understood, and but too often entirely ignored by those who desire to accomplish the most—the clergy. This is a fault, traditionally connected with theology, with which it seems to be hampered and so clogged, that it really seems as if theology and sound, rational, moral philosophy, based on a physical philosophy, could never at the one and same time hold possession and direction of the one mind. Modern theology, like primeval, ancient, and mediæval theology, will continue to cling to the divine origin as well as the divine power of cure of diseases, perversity, immorality, and deviltry in general. The clergyman, somehow, feels that to give up all this will place him in an undesirable position; that much, if not most, of his power will depart from him. Uneducated minds also find it much easier to depend more on prayer and on Providence than on science for their welfare and safety, as the former takes much less study, care, and expense, and is, whilst health and life last, the least incommoding, free-from-care lives; whilst he who depends and lives up to the teachings of science has many things to look after, avoid, and remedy, that his Providence-depending brother is free from. But in return, the rational being is less prone to sickness, being less subject to typhoid fevers, diphtheria, consumption, and such diseases, as well as he is less subject to insanity or milder mental derangements, criminality, and the like order of afflictions. A mental and physical dormancy or a constitutional tiredness favor a greater dependence on Providence than on science, and as these conditions, born of laziness, are apt to continue, theology will always find a fair measure of support from the unenlightened and lazy, or obdurate-minded, and continue to flourish. If the honest and conscientious clergy, however, could once be properly started, and made to appreciate physical facts, morality would be the greatest gainer. With these preliminary remarks, we will proceed to discuss the subject of ventilation.

Unimpeded ventilation accomplishes several objects. It is not alone in the necessary aeration of the blood that perfect ventilation assists us on the road to health and long life, with a better capacity for its enjoyment, but by its free and constant action, and the thorough diffusion and dissemination of the air, it also tends to render inert and harmless those disease germs and fomite productions that are the curse of populous centers; by ventilation we either prevent or mitigate the evils that may arise from the presence of either fomites or ochlesia. The general populace believe too literally that "sufficient for the hour is the evil thereof" to worry over the fact that disease germs have an inherent tendency to a tolerably long life, provided they are protected from the light and air.

When an episode occurs like that connected with the tearing down of the fever ward in the old New York hospital, where three out of the five masons engaged died of putrid fever in a few days,* or a case of diph-

* Hospitals and their Construction, by W. Gill Wylie.

theria or typhoid fever occurs in a room which has had similar cases a year or so previously, they are necessarily struck with the fact that the disease lurks about where it has once been, without its once occurring to them that this lurking is due to a tangible explainable cause, a physical avoidable result, and just as plain as that when you sow barley in the ground, Providence permitting, you will surely gather a barley crop. The fact that an old mattress, a manure heap where the stools have been emptied, drinking or bathing water, the dust in the crevices in or beneath the floor or in the wall, or wallpaper, carpets, or bedding, may have retained and conveyed the infection,† does not connect the fact to the popular mind that all these vehicles have carefully shielded and protected the germ from the air, or that most germs have at best but a short life if freely exposed to the air, and a remarkably short one if that air be dry, warm, and sunny.

Recent experiments on the bacillus of tuberculosis have shown it to retain a wonderfully long vitality, extending for years when buried in the ground, while Koch has demonstrated that in the air and sunshine its vitality is limited to some minutes or hours. In the Crimea, the ground occupied by the French and English army became so foul that the project of reducing Sebastopol nearly came to an end without any further diplomatic or armed interference on the part of the Russians. By digging long trenches in the shape of a cross, and building fires at the intersections of the lines, the ground was drained of the mephitic gases that threatened the destruction of the troops. The shifting nomad avoids all these dangers, and, as will be explained further on, he also escapes infection from cast-off clothing, the fact of the exposure to sun and air of the clothes having destroyed all infection being one reason, and his own better aerated blood being another.

From the above it will be seen that ventilation means more than the simple breathing of a purer air. It also means less danger from infection and disease, while deficient ventilation not only prepares the body and mind for disease and infection, but it also furnishes the viable causes for the disease and infection; hence the importance of the subject in a much greater sense than the one in which it is generally considered.

The busy practitioner, daily occupied with the struggle with disease, has his attention fully taken up with the therapeutic necessities of the cases before him. He is expected to know what will relieve and alleviate in this or that case; this is all the patient asks of him; and as he may be successful in this regard, so goes his reputation as a physician. This is really all that the community expects of him. Should he refer to past events, nothing strikes the patient as of any importance, unless it be some serious physical accident or illness that may have preceded the present complaint. A business reverse, domestic affliction, or a severe mental strain, perchance a candidacy for office in some exciting election, or doing business in an unhealthy locality or unventilated apartment, may have come and gone, but to him these are of no importance; if he cannot go back for a starting point to a steamboat explosion, a railroad collision, or a "bad cold which settled on his chest," he cannot see any reason why his present illness should antedate its commencement beyond a day or two. He may have had occasional headaches, probably even some disordered vision and slight vertigo, or, perhaps, felt at times unaccountably tired, forgetful, and an inaptitude to attend to business.

† Condensed Report on Typhoid Fever, Maine State Board of Health Rep., 1889.

but these are mere nothings, in fact it was not even worth mentioning; a seidlitz powder, or a peptonic or soda-mint tablet, generally has set him all right. He does not wish you to think that there is anything serious about him, as he knows full well that there is not; if you will be kind enough to prescribe for his present ailment, it is all he desires.

So it goes. Disease is simply looked upon as something that has a spontaneous origin. The past life, trials, and exposure are supposed to have left no trace or effect on the organism, and the future is expected to look out for itself. Poor patient! he plods along in blissful ignorance that the slight ailment, headaches, or weariness are but the picket-firing of the distant outposts to warn the main body of the approach of an enemy, while he, unheeding and in fancied security, finds himself a prey to his foes. The laity are not altogether blamable for their ignorance in these matters. Our profession has not taken the pains to have them enlightened, and, unfortunately, that very occupation in which we are daily engaged, the healing and reparative art, often obscures from our field of vision that preventive branch of our science to which we must soon look as to something of paramount importance, if we wish to raise a rampart against the rapid encroachments of the physical, intellectual, and moral degeneracy which is fast undermining the great mass of the population in civilized nations.

Statistics may at times be erroneous and unreliable, but there is no mistaking the fact that nervous and morbid irritability, as well as idiocy and lunacy, are on an alarmingly rapid increase. In England alone—where statistics are reliable—since 1859 the increase has been excessive, the total of idiots and lunatics being, after making all allowance for increase of population, all of 33 per cent greater than it had been for the same period of time previously. Throughout the land, asylums, hospitals, retreats, jails, and like institutions for the physically or morally wrong are multiplying, and infirmities and depravity are increasing at an equal pace. We all admit that for certain effects there must be specific causes. To find this cause falls to the province of the hygienist and demographer. As physicians, we are well aware that a pathologist must of necessity first be an expert physiologist; he must first understand the condition of the tissues in health and their normal action to be able to appreciate when they have deviated therefrom.

Let us, for example, take the Indian of America. Catlin tells us that in all his observation, both in North and South America, he never saw an idiotic, lunatic, deformed, rachitic, deaf, or dumb Indian, either male or female; neither did he, at any time, after the closest inquiry, find a tribe that ever had any premature mortality, deaths from teething, cholera infantum, or infantile diseases; neither did the women abort or have premature births.

My own observation among the Sioux, Chippewas, Winnebagoes, and the California tribes of Indians is confirmatory of the above; to which I might add, that although I have seen many of them drunk, I have yet to see the first case of delirium tremens in an Indian.

Benjamin Ward Richardson, in an instructive lecture delivered in 1885, before the Association of Sanitary Inspectors, reviewed the relations of the nomadic or homeless people of England in their relation to health and disease. He observed among this class a peculiar exemption to infection from zymotic diseases, mentioning particularly the gypsy, whom he has seen camped in neighborhoods infected with scarlet fever

without incurring any risk, and he has never seen one marked with smallpox ; these people have neither phthisis, scrofula, or any kindred diseases. From my own observations I do not remember ever seeing a feeble-minded, idiotic, or lunatic gypsy.

If, in a family of six, we were to find three who had partaken of some particular article of food, who were very sick, and the other three who had not touched it well and uncomplaining, we would be safe in assuming that the particular dish was the cause of the sickness in the first three. Now, if one of the well ones should accidentally or intentionally eat of the same dish, and likewise sicken and present analogous symptoms to the other three, we then would have conclusive evidence that this dish was the real and only cause of the disturbance.

If we apply the same rule to the general physical conditions, we find that barbarous and nomadic people were all in the enjoyment of the best of health ; that finally a portion became civilized, and then began to house themselves in ; that with this change in their habits and customs also came ill-health, physical and mental ailments, and general degeneracy. We notice further, that those who still follow the old nomadic habits retain their health and enjoy exemption from disease, but we also observe, that whenever any of these adopt the customs of the civilized man and go on and house themselves as the others have done, they sicken, and that their children become like the children of the close house-dweller—a prey to all kinds of ills and to premature mortality. That the change from an out-door to an in-door life is the cause of the departure of health is self-evident, and still better confirmed, when the close house-dweller partly resumes the more open-air life of his ancestors and is found to have regained lost health and exemption from disease. It needs neither bacteriology nor the pathologist to confirm our deductions.

Some years ago an Indian agent built a number of farm-houses for the Indians in his charge. What was his surprise, when on a visit some time subsequently, to find the house littered with the harnesses, plows, saddles, with other farming implements, and the Indians camped at a safe distance in their tent. On inquiry, the Indians told him that the house had made them all sick, and that some of them had even spat blood, and that they had moved out and were now all right.

There can be no doubt that the difference in health, depravity, and mortality that exists between strictly nomadic people, uncontaminated by border civilization and civilized man, can be attributed in a great measure to mode of habitation, as we find that those who live in large and well-ventilated houses, or whose occupation keeps them out of doors, and where the climate allows of free and constant ventilation at all seasons, that the people more nearly approach the state of perfect health enjoyed by the nomad.

Popular opinion on the subject is very crude. The majority have in some manner a vague idea of a carbonic oxide that kills, and some of the better informed will tell you of the Grotto del Cane ; they have also some idea regarding the favorite Parisian mode of suicide ; and they are not astonished at such occurrences as that of the Black Hole of Calcutta, the ship "Londonderry" with its seventy-two dead in the steerage, or at the English sloop that smothered all of its seventy passengers between Jersey and Southampton ; they also know that they should not venture where a candle will not burn. In my opinion it is the erroneous views

that they hold that prevent them from really and fully realizing that there are unseen dangers in unventilated apartments besides mere unrespirable air, and that the cause which daily places people where they are sure to suffer irremediable injury is their lack of knowledge concerning the real dangers. They rely for safety on the fact that the light burns brightly in a certain atmosphere, and that therefore they run no danger, the burning taper being their criterion of the respirable condition of the air. The laity should be taught, what De Saussure long ago demonstrated, that the fresh, invigorating, effervescing mountain air contains a greater percentage of carbonic oxide than the air of the plain or seashore, and that on a bright day the air of a London or New York park actually contains a less percentage of carbonic oxide than the air of the Catskills or the hills of Scotland. They should realize that carbonic oxide is not inimical to life, but only cannot support life; and that persons going into a carbonized air that will hardly support a candle alive, have actually at first not even found it objectionable; and that but in a few isolated instances this is the last source of danger from unventilation. We are not now speaking of the absence of oxygen, but only of impurities that mingle with respirable air. They should also understand that any injury, or even asphyxia, that may result from the presence of carbonic oxide gas in excess—that such sickness is quickly recovered from, provided the condition is not pushed too far. Where there is danger, however, the calamity occurs suddenly, and where the recoveries are made, they are as prompt.

As has been pointed out by Brown-Sequard and D'Arsonval, the morbid element in respired air is the pulmonary emanations, to which they might have added the perspiratory effluvia. The great delineator of the human passions and frailties, Shakespeare, has well depicted the effect of this effluvia from skin and breath in his "Julius Cæsar," where the rabble so yelled with a deal of stinking breath and threw up their equally stinking, sweaty night-caps, when he refused the crown, that it caused Cæsar to faint and Casca to hold his breath for fear of taking some of the poison into his own lungs.*

The best account of the effect of this organic poison is from the pen of Dr. Holwell, one of the twenty-three survivors who escaped alive from the Black Hole. His account, written in 1757, fully shows each step of the action of this intoxicant and narcotic poison, which, after many hours, left him still conscious, but "sensible of no pain and of but little uneasiness, with a stupor coming on apace, in which condition I laid down to die in peace, and gradually became unconscious." The maddening, intoxicating phrensy of men, as described by Holwell, cannot be ascribed to the mere fear of death, as British soldiers have met death, going down with dressed ranks in a foundering troop-ship that confusion might be avoided and the women and children saved. In that tempest and storm-tossed ship, however, there was not that poison from animal effluvia accumulating in their blood like fusel oil.†

Hutchinson well observed that "we unwisely neglect the study of the differences that exist between man and man—a difference that, for the most part, physiology takes little cognizance of, but which may prove of much importance in modifying the processes of disease."* In our zeal to

* Julius Cæsar, Act I, Scene II.

† Family Physician, chapter on Hygiene, published by Cassell & Co., London.

* The Pedigree of Disease.

master or to carefully study the disease, we are so apt to make it a self-consistent condition, and become so absorbed in our research, that we are apt to lose sight of first principles. Hutchinson deplores this tendency; and Richardson—in speaking of our classification of disease as “unsystematic and fanciful, and its nomenclature imperfect, even for the technical purpose of language, and inapplicable for the higher development of medical scientific research and practice”—also felt that we were drawing away from first principles.† Were we to keep in mind that heredity is only an acquired or cultivated habit; that, as our forefathers in the days of Tacitus roamed through the forests of western Europe without aid of spectacles, the physique of the German, Gaul, Goth, or Briton was the admiration of the warlike Romans, whose superior arms and discipline alone enabled them to overcome them; and that these men had neither gout nor phthisis—we could not reasonably say that we owe our infirmities to their simple, martial, out-of-door life. Heredity must, therefore, have had a subsequent origin so far as our diseases are concerned, and, as they do not originate spontaneously, where did they begin? Morel, in his work on the degeneracy of our race, places toxæmia as a primary cause.‡ Toxæmia has several sources from which it may result, and a careful study into the original cause of diseases will generally result in establishing the fact that outside of those originating in a specific disease germ, some form of toxæmia is generally the starting point of sickness, and that even most of the other diseases that owe their origin to, or that can be propagated from, a bacillus often themselves have their primary birth in toxæmia, whether it be from overfeeding, uræmia, or infection from the emanations of respired air, or from some animal or vegetable decomposing matter. From whatever source it may come, it often produces precisely the same results.

In a paper read before the Southern California Medical Society, entitled “A Plea for Circumcision,” I showed that one of the main dangers or results from reflex irritation lies in the toxæmia that it may induce. In the paper mentioned, I followed the different reflex processes due to phymosis up through to the obstinate and irremediable constipation due to sphincterismus, a condition described by Agnew,§ of Philadelphia. In following up the different steps that the condition assumes, I showed the immense importance that Sir Lionel Beale attaches to blood composition as the ground-work of health or disease, wherein he truly observes that “blood changes are the starting points, and may be looked upon as the cause of what follows,” the other factors being the “tendency, or inherent weakness or developmental defect, of the organ which is the subject of attack.” To which he adds, that he feels convinced that if only the blood could be kept right, thousands of serious cases of illness would not occur; while the persistence of a healthy state of the blood is the explanation of the fact that many get through a long life without a single attack of illness, although they may have several weak organs, and that an altered state of the blood, a departure from the normal physiological condition, often explains the first step in many forms of acute or chronic diseases.* Sir Lionel might have added that the “tendency or inherent weakness or developmental organic

† Diseases of Modern Life.

‡ *Traité des Dégénérescences Physiques.*

§ Agnew's Surgery, Vol. I.

* Beale. Urinary and Renal Disorders.

defect," which, after all, is all the foundation or ground-work for the hereditary diathesis, is itself the outgrowth of transmitted toxæmic tendencies, or conditions affecting former generations, or of previous toxæmic results in the individual itself, as we can safely assert that our fathers, of barbarian memory, left us no inheritance of developmental organic defects. The daily increase of these physical defects shows plainly that they are so, not from inheritance, but from present causes or cultivation, as well as it plainly explains that toxæmia lays the tendency to reflex troubles, also on the increase, which in turn favors further toxæmia by the disturbances, deterioration, and morbid sensitiveness that they occasion—the retroactive effects of either good or bad physical condition being here fully exemplified. Fothergill shows how this condition of blood, whether due to reflex irritation, unventilation, or overfeeding, or from mental disturbances, eventually results in uræmic difficulties which engender kidney disturbances, notably Bright's disease, and that instead of these diseases being the cause of the uræmia that finally takes off the patient, the uræmia is the real starting point of the kidney disease, which goes on until such structural change has been effected that we reach that point where the kidney is no longer equal to its functions—the renal inadequacy of Sir Andrew Clarke.†

In the Bradshawe lecture, an extract of which appears in "Braithwaite" for January of 1889, William Carter observes as follows: "According to Bouchard, one fifth of the products of the total toxicity of normal urines is due to the poisonous products reabsorbed into the blood from the intestines, and resulting from putrefactive changes which the residue of the food undergoes there."

One of the changes that full respiration in the open air effects in the blood is the destruction of these toxic elements. This is mentioned for the purpose of explaining the intimate relations that exist between all the causative conditions, physiological or pathological, that tend to induce toxæmia. The large-lunged and deep-chested Indian will eat at one meal as much food, indiscriminate as to quality or state of preservation or of putrefaction, as will an ordinary white man for three days, or even a week; but toxæmia, with the attending ills, does not find in the Indian a favorable resting-place, so that after the most gourmandizing meal he is in no more danger from toxic absorption than he is from an attack of delirium after the most generous or protracted drunk. Former perfect aeration of the blood has not left him with any developmental organic defect in the minute structure of his organism, and the present perfect condition of his respiratory apparatus oxidizes and works off into the outer air all the toxic products that are brought to it. He needs neither pepsin nor naphthalin to insure him against toxic accidents.

It is evident that we have different sources by which the blood can be charged or overcharged with toxic products, but it must remain fully as evident that nature has given us the organs of respiration for their elimination. The skin and kidneys are depurative mediums, and very important channels it must be admitted, but we must not fail to recognize that they are not the chemical laboratories that the lungs represent. It matters not if all the chemical changes do not take place in the lungs, it is through the lungs that the agents are taken that must bring about the changes; and, after all said and done, it may safely be assumed that

† J. Milner Fothergill, in *Satellite*, February, 1889

imperfect blood depuration is the starting point of ill health, either physical, mental, or moral, for what matters it whether you have a pneumonia or phthisis, or are even insane owing to a cardiac derangement, or are insane from uræmic retention due to Bright's disease, or you are laid out racked with gout, rheumatism, and allied disorders, or are even watching the slow approaches of grim death through the slow process of senile gangrene, with an amblyopia that even robs you of the comfort of reading, and distraction, we must in every case go back to the primary cause, which will always be found to be toxæmia. It is always imperfect blood depuration that is the *fons et origo mali*.

To what fine distinctions, differences in condition of health or disease may be due, after the developmental defect or inherent tendency has once been established, and to what trifling circumstances a person may attribute his particular point of divergence from health, may be inferred from the fact that even in an apartment where the ventilation may be equal in all its parts, a particular form of task may so affect the breathing organism by strengthening or weakening the organs of respiration that a statistical difference in the health of each class will be noticed. For instance, Lombard long ago furnished statistics that showed that the copyist was much more prone to phthisis than the bookkeeper or accountant,* the steady, unmoving work of the former occupation making the difference; the typesetter in a printing establishment is much more subject to the same disease than the pressman.

Another condition of affairs which must not be overlooked in this connection is the fact that the predisposition or tendency-causes do not by any means cease with the departure from the office or work-room, for the better developed muscles of the chest, in the pressman or ordinary and more active clerk, when in the outer air, so work as to more effectually empty the lungs and aerate the blood, while in the copyist and typesetter, as in the mosaic worker, they are weak and undeveloped, and but ill perform their functions, so that even when in the outer air, owing both to lesser chest capacity and feebler respiratory movements, aeration is never as perfect; so that either in the house or out of doors he loses more ground in the physical scale than the other classes. I have purposely taken the extreme illustration, where, however, statistics fully support the proposition, to show that the physiological working condition of the respiratory apparatus cannot all be overlooked, and that all does not depend on sanitary architecture.

There is much in popular errors that helps to bring about our condition of physical degeneracy; for example, people look upon cold as their great and dreaded enemy, whereas cold, unless in an extreme degree, does not and cannot hurt any one primarily. To shut out the cold, which is harmless, they shut themselves up with ochlesitic poisons, as moribific and fatal in the end as the effects of alcohol or fusel oil. They have a vague idea that "catching cold" is to be avoided, but they have not the least idea of the lasting poison of ochlesis or in fomites. A man will give a friend a wide berth during the critical period of typhoid fever, but as soon as that period is passed, he and his whole family will troop into the room, in blissful ignorance of the researches of Uffelmann and others into the wonderful tenacity of life possessed by typhoid bacillus; or, so that they avoid the immediate breath of a consumptive, they live in fancied security. That this infection, as well as that of typhoid and

* L'Influence des Professions sur la phthisis pulmonaire.

other disease germs, is longer lasting in a dark or north room, is not of any importance. The lady of the house, on the departure of her consumptive visitor, will at once draw the curtains and close the windows of her parlor that the light and dust may not affect her carpets and bric-a-brac, perfectly unmindful that the care she bestows to protect these things she may do at the expense of the health and life of a son or daughter; she does not know, nor has she taken the pains to learn, nor has any one undertaken to instruct her, that the bacillus of such diseases as typhoid fever, diphtheria, phthisis, and most diseases which have a specific germ, cannot exist and hold their identity in solar light and air, which, as has been demonstrated by Koch, kills them in from a few moments to a few hours, which leaves no room for doubt that, by the construction of our houses and by the studied exclusion of light and air, we do most for the retention of these disease germs, and at the same time contribute to the preservation of their vitality. I have alluded heretofore to the injury that deficient ventilation does to humanity in producing toxæmic conditions; we now see how the same deficient ventilation tends to maintain germ infection.

It is probably in a bird's-eye view of the many phases that the pathology of phthisis has at different times assumed, and of the various forms of treatment that these changing views have inaugurated, that we see how and wherein the importance of ventilation to life has been so shamefully neglected, how, as it were, in the general advance of knowledge, as in a line of battle, the too rapid advance of one portion has risked the fate of the battle. The study of the etiology and pathogeny of this disease, and the wonderful discoveries of Koch, and the many ideas in regard to its pathology, etiology, or pathogeny that have been advanced here and there, have all absolutely been instrumental in obscuring from us the fact that air and sunshine are its preventives, and that it matters little what therapeutic means we may call to assist—that unless we add plenty of fresh air and sunshine, all our efforts are ineffectual.

We can easily observe the ludicrousness of the appearance of the legs of the Pope's body-guard in their variegated coverings; but we must certainly admit that it is more ludicrous to see a patient going in one direction to have the air pumped out of a cabinet wherein he is to sit, on the Jourdanet idea of an artificial Anahuac climate, and that rarefied air is the proper thing, and another going in another direction to be inclosed in a Pravaz pneumatic cabinet of compressed air where air will be pumped into the cabinet.

It is very evident that Jourdanet failed to grasp the plain truth, in not observing that it is neither the altitude, barometric reading, nor rarefied air that gives the Anahuac plateaus and the Columbian or Peruvian Andes that exemption from phthisis, any more than it is the depression below sea level and compressed atmosphere of the Kirghis steppes, the valley of the Jordan, or of the desert of the Colorado in Southern California, that exempt their dwellers from the same disease—any more than filling the lungs with a gaseous compound by the mouth or the colon per rectum by chemical gases at regular intervals could keep an Indian from having phthisis if suddenly taken from his native plains and housed in an average boarding-house. The Tartar of Kirgheez and the Peruvian Indian of the high Andes need no rubber bag of gas with a rectal tube, microbe-killer, or medicated woolen garments to protect them from phthisis; and the microbe or bacillus that finds its

way into those Peruvian homes—which Americans find so peculiar that people sit in the chilly air with their shawls without having sense enough to close the doors—finds a short existence.

Davis, a former Governor of the British colony in Hong Kong, in his work on the customs of the Chinese, tells us that, among the higher classes, when a visitor arrives, he finds a ventilation in their large and open apartments equal to that out of doors, but that the host has generally a large assortment of furry coats which are handed out something like napkins at an afternoon tea; with his other hospitalities, the Chinese gentleman sees to it that his guest's health is not ruined in his house.* It might be added that the free use of weak and tepid tea, in which they all indulge, acts in no small way as a preventive of uræmic accumulation, for without going to the extent advised by Sangrado in *Gil Blas*, there is no doubt that many of our people, considering the amount of food they consume, take hardly enough fluid to assist proper blood depuration.

The example of the Chinese in regard to ventilation and hospitality could be ingrafted into our civilization with benefit not only to our health but to our morality. Some may perchance think that with the indiscriminate use of these garments, diseases would be more and more disseminated. This would not be the case, however. In the first place, there would be less diseases; and secondly, Richardson, as already observed, has shown that vagrants who deck themselves out in cast-off odds and ends of clothing, which are often infected, hardly ever receive any harm from the clothes, the sun and air having effectually slain all the bacilli or disease germs. I cannot see why the profession cannot accept the fact that pure air and sunshine are the preventive agent, as well as the curative means, in phthisis, and drop all of those makeshifts with which they torment themselves and the patients, such as the hot-air treatment with which some undertake to circumvent the wily bacillus.

Gout and rheumatism, as well as asthma, owe their origin to deficient blood aeration much more than is generally believed. The classic attack of gout suffered by Sydenham when composing his work on gout, as well as that other attack suffered by John Brown, equally as classical, but more important, as it was the keynote to a revolutionary movement in medicine, and an inauguratory point for the conception of the Brunonian doctrine of *sthenia* and *asthenia*, were undoubtedly due to the weakened and imperfect respiration that at the time affected those two beacon-lights of medicine. The English Hippocrates was no doubt absorbed, and writing with bated breath his dissertation on gout; and from Brown himself we learn that he was weakened down and below his normal condition of health at the time.†

Loomis writes, in his edition of "*Charcot on Diseases of Old Age*," of a Confederate officer in whom the gout was developed by confinement in an unhealthy and damp prison, with insufficient food;‡ and is it not a generally known fact that Holwell, already mentioned, suffered from a severe attack of the gout in one foot a few days after his liberation from the Black Hole?§

* The Chinese, by J. F. Davis, F. R. S.

† Brown's Elements of Medicine, Preface.

‡ Wood's Med. Library, Vol. June, 1881, p. 91.

§ The Family Physician, Cassell & Co., Vol. IV, p. 971.

I have seen instances of gout developing under similar circumstances, notably the case of a physician accustomed to an out-of-door life, who found himself confined to the bedside of his child afflicted with measles; he never left the little fellow's bedside, and the room was kept closed. On the recovery of his son he suffered severely from his first attack of gout. Although his family has no gouty or rheumatic history, they being long-lived, hearty people, one week of close air developed a disease that may require generations of careful watching and pure air to eradicate from the family should he have any more children.

On the other hand, the case of the rich and gouty old priest, observed by Van Swieten, and mentioned by Fothergill in his work, § is very instructive. Here was a cheerful old gentleman of the old school, a good liver, who took but little exercise, well fed, and taking his after-dinner naps in a room carefully closed to exclude the heat and flies of summer and the cold of winter. We may rest assured that he used his respiratory muscles but to very little purpose, probably never taking a deep respiration, unless after his social pinch of snuff with the burgo-master, which undoubtedly induced a healthy sneeze. His capture by Barbary pirates, who took no stock in full meals and after-dinner naps in close rooms, cured him of his gout; the fresh sea air and the deep inspiration required properly to propel a galley oar furnished a medium through which a complete oxidation of the urea took place, and an efficient exhalation of all toxic material.

Professor Marfan, of Paris, has related the occurrence of what might plainly be called an epidemic of phthisis, where one consumptive in an atelier, by promiscuous spitting all over a rough floor, so managed to infect the rest of his twenty-two fellow-workers that in six years after his own death they began to die rapidly, until fifteen out of the twenty-two were gone. Marfan and Vallin laid the blame on the character of the floor and the sputa infection; the old floor was removed, the apartment disinfected, a new, well-jointed, and smooth floor laid, and the epidemic ceased.* Cases like the above, but not so extensive, are common enough to make us feel a wholesome dread of the bacillus, regardless of what contrary opinion others may hold, and founded on ever so many experiments. But this does not alter the fact that we have depended too much on the bacteriological origin of phthisis. Where one person becomes phthisical through the bacillus, there are a dozen that have become so without coming in contact with it. And while in our zeal we have pursued this branch of our science, we have closed our eyes to the fact that deficient ventilation is the most prolific source of phthisis, regardless of the presence or absence of the bacillus. We are getting to depend altogether on the bacillus, which, like Falstaff's men in buckram, is multiplying and fast becoming the cause of every form of disease.

Another incident wherein the bacillus is made to usurp deficient ventilation as the cause of a disease, is the lately discovered fact that a bacillus has been recently found in connection with trismus. To attribute the origin of trismus to any bacillary cause we must altogether ignore all that we know of the disease. If the literature on the subject were scanty, or obscure and indefinite, and the observer incompetent, and our experience in its connection unconclusive, we might begin to doubt; but such, however, is not the case. The literature is very intelligent,

§ Gout in its Protean Aspect, p. 164.

* Boston Med. and Surg. Jour., Vol. 122, No. 18.

authentic, and exact on the subject. The work by John E. Morgan, F.R.C.P., entitled "The Diseases of St. Kilda," devotes much intelligent explanation to the cause of trismus. Morgan was a close observer, and noticed that the disease did not prevail on the neighboring Hebrides. In his search for a cause, he observed that a like equable, mild climate affected St. Kilda and the Hebrides, but he noticed further that while in the latter islands the inhabitants live in the Scotch bothies, such as are found on the Scottish coast, built of loose rock and stone, with plenty of crevices and an open chimney, those of St. Kilda were built of rocks, but closely cemented at every joint; and that although, as in the other islands, a peat fire is used, the cottage or hut has no hole for the escape of the smoke. On inquiry he found this difference in custom to be due to the scarcity of seaweed on the St. Kilda shores. On the Hebrides, either owing to different winds or ocean currents, the weed is plentiful, and is used for manure, while at St. Kilda the soot that has gathered on the walls and under the roof is scraped off in the spring and used to enrich the fields. To allow this soot to collect the house is kept carefully closed. Doctors Morrison and Maxwell, who practiced in the West Indies, attributed the existence of trismus in those islands to the confined and smoky condition of the houses. The same may be said of the negro huts on the Florida and Georgia coasts where trismus has been observed, and lastly, the experience of Joseph Clarke, and subsequently of Collins, in the Dublin Lying-in Hospital, where by continually improving the ventilation the trismus epidemic was checked, would seem sufficiently to prove the foul air origin of the disease.

On the other hand, it must not be overlooked that want of ventilation will engender very infectious and contagious diseases. Dr. Parry, in discussing other subjects, says: "It may be stated, as a general proposition, that all living bodies, when crowded together, generate a matter which would seem to be highly destructive. No species of animal can congregate in ill-ventilated apartments with impunity. Under such circumstances, the horse becomes infected with glanders, fowls with the pip or pep, and sheep with a disease peculiar to them, if they be too closely folded. It is worthy of remark that these diseases, evidently engendered by congregation, become subsequently contagious. In the expedition to Quiberon, in 1795, several transports, crowded with horses, had their hatches shut for a considerable time in a storm, by which some of them were suffocated, and amongst the surviving horses the contagious disease called glanders was propagated. At another period it was proposed to send livestock from England across the Atlantic, but the animals all died of a febrile disease in a few weeks, in consequence of being too much crowded." From this we may readily see that the ill-effects of unventilation are more far-reaching than generally believed, and we can as readily perceive how the same cause may engender serious organic disease in men. Furthermore, we cannot escape the conclusion that it is not alone the individual sufferer who may be the victim, but that a violent contagious or infectious disease may, from such a small beginning, nearly depopulate some countries. Asiatic cholera but too often has such a possible factor.

Maudsley has well said that the mind is the most dependent of all the natural forces, and that for its existence all the lower natural forces

are indispensably prerequisite.* The time has gone by when the mildly lunatic was tortured, hung, or burned at the stake as a criminal, while the phrensiad, raving maniac was either chased about like a wild beast or considered as a demoniac and deluged with holy water and prayer. Pathology has here opened up a study that has not yet fully brought out all its fruits. Liver abscesses, or empyema, is now known to derange the mind as much as we realize that intestinal irritation will produce night terrors. Readers of Silvio Pellico's "My Prisons" will not forget his graphic description of the hallucination that he suffered while confined under the "leads," or leaden roof, of the ducal palace at Venice, finally relieved by what must have been the spontaneous discharge of an abscess into the intestinal tract, when all the mental disturbances at once left him. It is also a recognized fact that uræmic retention holds a very close relationship to insanity, Dr. Alicé Bennet showing, in a paper read before the Pennsylvania State Medical Society, the connection between it and Bright's disease.† The connection between the habitual or excessive use of stimulants and the development of insanity is too well acknowledged to require more than mere mention, except that we may add that it is among the lower classes who use the excess of liquor that we find the greatest amount of lunacy, and observe further, that which has been more than once suggested in the course of the paper, that by insufficient analyses of our subjects we oftentimes connect and mingle coexisting effects as cause and effect, and often place a result as a primary cause. In this respect we must not forget that among the poor there is an inherent tendency to infirmities, mental and moral, as well as physical—a condition due to the deterioration caused by want, lack of proper nourishment, anxieties, suffering, and lastly, but not the least, the foul air which they must of necessity continually breathe. Liquors and stimulants are the causes to which all the miseries and physical as well as mental afflictions of the poor are attributed—as if poverty itself were no misery, and did not carry in its train sufficient ills aside from the use or abuse of alcohol! The premature mortality so excessive with the poor, their ailments, feeble-minded, rachitic, or consumptive children, depravity, moral degradation, idiocy, and insanity—in fact, all that may happen, either in the line of physical or of moral degradation, is attributed to alcohol. Alcohol with them has become a necessity, owing to the morbid condition induced by foul air.

A reviewer of Acton's work on prostitution mentions the swarms of child prostitutes that infest the low quarters of London, whose existence he attributes to a "brutal stupefaction of the moral senses, resulting from an utter ignorance of what is good or evil." Were I to review the reviewer, I might ask how ignorance can cause brutal stupefaction of the senses, either moral or otherwise. In the present age, we fully understand that for all effects there must be a specific, self-sufficient cause. It may not be found at once, but we should neither jump at a conclusion nor cover our ignorance in the matter by a mere figure of speech. Saying that their mothers drank alcoholic liquors, and that precept and example have lowered and debased them, even if they are too young to have drank themselves, does not satisfactorily explain the existence of the swarm of child prostitutes, or how they arrived at the stupefaction of the moral senses. My own opinion is, that on alcohol

* Maudsley. *Physiology and Pathology of the Mind.*

† *Med. News*, Oct. 4, 1890.

we lay the blame so that we may not blame ourselves for the indifference and neglect of the human family in our immediate neighborhood: it is a certain relief to the conscience to say that they drink—drink has brought it all on them: we then wash our hands, like Pontius Pilate, and the Passion Play goes on. Drink, however, does aggravate and precipitate many conditions that the poor have in them with a strong inherent tendency. Every practitioner knows that among the children of the poor, living in crowded tenement houses or basements, there exists a disposition to convulsive and nervous diseases, as well as that they are more subject to zymotic diseases; and that, too, where the parents are habitually sober. Nearly every physician who has had such practice has often wished for the wealth of a Vanderbilt or a Jay Gould, that he might relieve the poor, patient, anæmic little children who seldom see any joy, and who seem from birth wedded to a life of misery. The question has often occurred to me, while looking on these helpless children, is it possible that the philanthropist and statesman are unacquainted with the effects of foul air? That such an air, which will give an ordinary gentleman, accustomed to well-aired rooms and fresh air, a headache that will last him all day, or even produce in such a man an illness, must be poisonous, no one will doubt.

In a concentrated accumulation this foulness has shown serious results besides the Black Hole and other such episodes. Guy, in his work on Public Health, quotes from Sir John Pringle, in connection with the work of the philanthropist, John Howard. He there relates that in the May sessions of 1750, at the Old Bailey, forty persons perished from putrid fever, caused by breathing the foul air that issued from the jail-room and prisoner's dock; of this number, four were Judges, and the rest officers, barristers, and jurymen. That was an extreme case; but I have often visited sick children in rooms and beds, where between the fumes of cooking, the over-heated room, and the steam from drying clothes, added to the exhalations of half a dozen large-lunged human beings, the room was so offensive that I made my visits very short. This air has precisely the same effect as alcohol or fusel oil, and the slow, steady effect on the nerves of the susceptible little child is to create a morbid irritability which later calls for alcoholic support. The little bodies of these poor children have no more resistance, strength, or endurance than their little brains; they are morbidly sensitive, and age early; want has developed a precocious sharpness of instinct, and the foul air that has poisoned their young blood has precociously matured their sexual organs, while the rest of their physique lacks development. Foul air is more than sufficient to cause all these conditions without the assistance of alcohol either in the child or its parents. It is the foul air that produces that "brutal stupefaction" of the moral senses before alluded to. In one London parish, out of eighty little girls raised in its work-house, seventy-nine were afterwards found, on an investigation, to be on the street,* and Dr. C. F. Taylor relates that in one New York asylum for feeble-minded children, fully two thirds of the children masturbated, the proportion being about equally divided between the sexes. By careful investigation it developed that among these feeble-minded children the habit came by intuition—the morbid excitability of the sexual organs being the cause—without assistance from either precept or example. The girls were found to begin at the age of eight, and the

* A Home for the Homeless, by the Hon. Mrs. Wray.

boys at ten.* Society and the State furnish millions for the suppression of the depraved class, when a tenth of the sum would effectually prevent its formation.

The unnamed author of a remarkably instructive little work† on ventilation in its relations to life and disease, makes the following true observation: "The combined testimony of those who have taken the pains to investigate the causes of vice and prostitution leaves no doubt that a low condition of body and mind, coincident with a morbid irritability of the brain, so far from restraining (as might be surmised) the animal propensities and vicious inclinations, has no inconsiderable share in their aggravation and production." The effect of foul air on the brain has been well depicted by James Johnson, in connection with the death of Mr. Justice Hays, who was stricken with paralysis and apoplexy after a day's sitting in the foul air of a court-room. "The blood," observes the doctor, "imperfectly aerated, and charged with the exhalations from numerous lungs breathing the same atmosphere, is impeded in its passage through the minute arteries, whose muscular walls contract and hinder its progress. Hence the sense of fullness, pain, and throbbing in the head, while the heart beats with increased force to overcome the impediment and to drive on the blood."‡

Dr. Johnson's labors in the field of renal diseases are well known, and he explains in the above the cerebral action of impure blood, a subject with which he is perfectly familiar. It is preposterous to imagine that the delicate brain and nerves of a child can stand the continued effect of such a poison without harm; and civilization can only plead ignorance as an excuse for its sin in the way of omission, in thus neglecting the child and allowing it helplessly to grow up food for the jail or the gallows. Were the clergy to study physical causes and effects more, they would see that the first principle to be instituted to obtain a moral man is perfect sanitation, without which all mission work and sermonizing might as well be made to the four winds.

As a summary of what has been advanced in the foregoing paper, it may be stated that it has undertaken to show that the visible point of departure from a condition of general good health and an unimpaired organism is plainly where the nomad diverges from the free, out-of-door life of his ancestors, and incloses himself within four walls and a roof that exclude the sun and air, and retain his own exhalations. Prior to this occurrence we can find no history of developmental organic defect—neither inherent tendency in any organ or part to disease, to morbid irritability of body or mind, or tendency or liability to reflex troubles of any kind. That ventilation is the prime factor that induces this wonderful moral and physical perfection by allowing the aeration of the blood to be fully carried on as the Maker intended, is evident from the fact, as cited by Hirsh, that there are populous industrial centers on the high plateaus of the Andes, cities of from twenty thousand to three hundred and twenty thousand inhabitants, where the bacillus tuberculosis does not seem to thrive or find a lodgment; so that mere density, industrial pursuits, or civic aggregation cannot be said to be the cause of the physical degeneration observed elsewhere. The secret of the exemption in these communities is found in the simple fact that either in August

* Am. Jour. of Obstetrics, Jan., 1882, p. 163.

† House of J. S. Redfield, Clinton Hall, N. Y., 1849.

‡ London Lancet, Dec. 11, 1869, p. 824.

or January the thermometer marks 60° F.; that their houses are never closed at any time; if they feel chilly, they simply put on an extra shawl or poncho, *but they do not close the door*. It may also be stated that these localities are not financially drained to maintain swarms of idiots, lunatics, rachitics, crippled paralytics, criminals, or prostitutes, either in reformatories, asylums, hospitals, or jails. Such are the facts, and we can draw our own inferences. One thing is certain, that these people literally live out of doors.

The erroneous opinions of the public in regard to the effects of good or bad ventilation have next to be considered. That ventilation does not receive the consideration that it deserves from the public, is undoubtedly due to the reason that they misapprehend the really dangerous element that lurks in non-aerated rooms; further, they lack the appreciation that there exist gradations in effects proportionate to the causes. They can, as a rule, only appreciate extremes of conditions. That each intermediate fraction of space between a sane man and a phrensied maniac can be accurately filled by a specimen representing each gradation cannot be understood by them, any more than that one gradation leads to the other. Neither can they understand why there should be preparatory processes to the inception of a diseased condition. When the poor consumptive asks you simply to give him something for his pain in the chest, or to stop the cough, or to arrest his night-sweats—it is all that he wants; stop that and he will be all right—it fully shows the popular idea of disease and the popular appreciation of the processes through which the body must pass to reach certain stages or conditions. It cannot be said of them, as the French said of the returning aristocracy in 1814, "They have learned nothing, but they have also forgotten nothing." Through civilization our people have learned nothing of benefit to their health, and they have lost that instinct for fresh air so dominant in nomadic tribes. Oswald relates that when the Circassian chief Shamly-Ben-Haddin was captured by the Russians, in 1864, he offered his captors the best part of his rations and all his personal valuables for the privilege of sleeping in the open air, feeling that one week more of the nausea and headache consequent on his sleeping indoors would drive him to suicide. General Houston, who spent his life among the Cherokee Indians, never could endure a close room or a crowded hall for more than a few minutes. As our people have forgotten or lost these instincts, they should be instructed as to their danger. With no knowledge or instinct in so important a matter, it is not surprising that they so often come to grief.

There is no reason why they should not understand that the strength and endurance, health and expectation, of life must be measured, like a chain, by the weakest link, and if that one organ be enfeebled, the apparent health and strength of the other only hastens the destruction of the whole, for, as George Murray Humphry observes, it is requisite to longevity that "each organ must be sound in itself, and its strength must have a due relation to the strength of the other organs. If the heart or digestive organs be disproportionately strong, they will overload and oppress the other organs, one of which will soon give way. One disproportionately feeble organ endangers or destroys the whole."* If the laity could be made to realize that between lasting and enjoyable health, and sickness and lingering misery, there is but a shallow and an almost

*Humphry. Old Age.

imperceptible Rubicon to be crossed, whence there is no returning except on a compromise made by running the whole machine on the basis of the weakest organ, and that one hour spent in a close room may be to them that Rubicon, much more attention would be paid to the importance of ventilation. The writer has seen, more than once, a child born perfect and sound, but one half hour's overheating in a close room, by an over-solicitous nurse, produced a nasal stenosis that has followed the child into adult life, with the anæmia and all other ills that accompany such a condition of affairs, changing the temperament and constitution completely from what it would otherwise have been. Ventilation will not exempt man from all things; but, from a careful consideration, it is safe to assume that if all the ills that deficient ventilation does create were eliminated, the remainder would require but little care.

Hippocrates gave us air, water, and locality, as the three ingredients of climate. Angus Smith gave us the chemistry of climate, which analyzes the quality of the air. After many excursions and exploring expeditions in search of something better, we are gradually drifting back to our old friends' way of thinking, and we are now as convinced of the uselessness of climatic classifications as we are of those of drugs or diseases; in fact, we have found out that the many pursuits and side studies, researches and discoveries, have, through our zeal, led us somewhat astray. Sydenham, Heberden, Boerhaave, Tissot, and Rush all tended to a greater observance of nature, and tended more to treat the individual man than the individual disease; the latter they generalized more than we have done. Beale, Thompson, Fothergill, Johnson, Hutchinson, Black, and Richardson have so far advanced beyond the beaten path that medicine has trod during the last sixty years, that they recognize a great fatherhood to our ills and pains in one great standing and distinct point, this being where perfect depuration ceases and where imperfect blood depuration begins. It is this that marks, as it were, the visible line of physical differences as a mass between the nomad and the civilized man, and its cause is in a free or an imperfect ventilation. The limits of this paper will not permit a dissertation on all the remedial measures that should be instituted to relieve the evil conditions pointed out. Were it practicable to reëstablish the old Spartan tables of the Lycurgan system—with its black broth, bread, olive and fig banquets, and with it the iron money—it would at once sweep free the coming generations from the cursing evils that affect the present one in a fast increasing ratio. It would not only benefit the poor, whose blood is impoverished by too innutritious food, and who are poisoned by foul air, but it would equally benefit the rich, as the bill of fare of the Lycurgan board tended not to induce diseases due to plethora or uræmia; but it is useless to dwell on such an Utopian prospect. Chauncey Depew and Ward McAllister would put their foot down on any such proposition. Were people less touchy about the question of interference with their immediate personal rights, the opposite of the method suggested by Dr. Lindley of Los Angeles, at the last meeting of the State Medical Society—that of castrating all male criminals for the extirpation of the criminals—might be adopted, this being the removal of the ovaries of every intemperate woman; there would be one advantage over the method of Dr. Lindley, in this: there would be no chance for a mistake. As the old French detective proverb went, when they were in

search of a criminal, "Get hold of the woman, and you will soon catch the man." According to Dr. Lindley's plan, the wrong man might be operated on; but as no intemperate woman can carry a child for nine months, while she is in a state of inebriety, without affecting the child, and as in the choice of sexual selection some otherwise very good men are so terribly careless, I feel that, were it practicable, this would be the best way to extirpate the class. This, however, cannot be done. But there is something that can be done: intemperate women should not be allowed under any circumstances to suckle children. A child would run much less risk, in the first place, by being raised by hand; and, in the next place, its future welfare would not be jeopardized either physically or morally.

In this connection I cannot help mentioning the grievous injury inflicted on children who are put out to wet nurses, by the parents' furnishing beers and liquors to the nurse that she may give a more copious supply of milk. As observed by Griesinger, insanity or mental conditions are formed in their germ at very remote periods from the time that the actual disease appears,* the generally supposed real causes being only the precipitating or determining causes. Failure in being able to provide is generally in a popular or legal sense limited to the question of a sufficiency of food and clothing to keep body and soul together. The State should recognize this failure in a broader sense. The father of a family may be able enough through his labor to provide ample food and clothing, but too poor to provide proper air. The child may live, but so warped physically or mentally or morally that it were better dead. Food and clothing are not the only necessities by any means. They may be like the last meal of a condemned man—sufficient to give him strength to mount the scaffold. The State should recognize fully the effects of foul air on the children, and make it a necessity that they should have fresh air. To this end it should assume the charge of these children. The Spartans, as well as the Indians of Southern California, took charge of *all* the children, thereby assuring the community that they should suffer neither through want nor self-indulgence, to the evident benefit of their physical and moral welfare. Our civilized communities should certainly have charge of the children of those unable or unfit to care or provide for them. We do not treat the domestic animals so thoughtlessly. A horseman would be shocked to see a thoroughbred colt in a foul and unventilated barn, or feeding on deteriorating food. His instincts for the welfare of his loved animal would even probably induce him to pay double his price, if required, to save a noble creature from losing that physique, intelligence, courage, and endurance that belong to him, and to keep him from degrading into an old hack or common horse, just as philanthropists of old devoted all their earnings and fortune to the purchase of Christian captives from the Algerine corsairs. The same spirit cannot all be dead. Our philanthropists and statesmen should fully and thoroughly comprehend the dangers and situation of these children, who, in the long run, will otherwise only grow up to be the *chair a canon* for our charitable or penal institutions later on. In taking charge of these children, it should be the aim of the State, not only, as unfortunately it is done now in unavoidable cases, to provide a charity home or mere resting place, but it should use its endeavors toward their physical, mental, and

*Griesinger, Ment. Path. Wood's Med. Lib., 1882.

moral education, as it does to its soldiers, from whom it expects future service. They should not be treated or made to feel as paupers, but as children only receiving their dues and from whom the State expects future recompense, just as the future horse in time will repay his keeper and trainer for all his kindness and care, as depicted in the winning horses of Ben Hur in the chariot race, where former kindness, good treatment, and training show good results. All this is not as Utopian as it is barbarous, cruel, and unchristian to neglect it. Where a gentle, weak woman could have guided the child aright under proper hygienic surroundings, we, in after life, turn the world upside down with swarms of detectives, at a tremendous expense, to hunt down the same being who, through unhygienic surroundings, has been converted into a vicious, determined criminal, that the majesty of the law may be vindicated.

We might better begin early, and, by surrounding the little helpless human being whom a cruel destiny has intrusted to keeping that is not of its own choosing, with better hygiene, better precept, and better example, vindicate the majesty of our enlightenment, civilization, manliness, and Christianity. These poor children never know either childish innocence or childish joys; for them there are not in after life those memories of childhood to soften and make them better, for they have had no childhood; they have prematurely aged in every sense, and the struggle for life, in all its bitterness, has been pressed like a full cup to their helpless little lips when scarce out of infancy. No wonder that the low quarters of our great cities swarm with multitudes of prostitutes scarce out of childhood, and that a brutal stupefaction has in them overcome all moral sense—a moral sense that might be said to be stifled at birth, for it requires a pure and uncontaminated atmosphere for this to thrive—something which the poor child has never enjoyed.

As observed in relation to the interpolation of various branches of science in their effect in obscuring from our view many of the simple truths of medicine, and the suggestion that we retrace our steps to spots where we know a sound foundation exists, so we may well remark to our kindred profession, they of the cloth, that if they were to have less theology and more practical, Christian common-sense, it would be better for the ends that they profess to wish to reach. It is not beyond their province, as the Mosaic law is full of examples. If the great Master was not above realizing that the welfare of his chosen people greatly depended on their physical condition, his followers should not consider it beneath them to follow his example; if the Mosaic teachings could notice even such trifles as the need of the proper aeration of the excreta of the multitude crossing the desert by the aid of the dry, powdered earth, our present shepherds should not be slow in recognizing the same facts, but how much more urgent by reason of our greater density and stability of population. The pulpit, like medicine, is losing much of its usefulness in rhetorical flourishes and figures of speech. When the great Master was asked the road to salvation, he pointed neither to shelves of the theological lore nor to a collection of tracts on the ethics and ceremonies of religion: his answer was of few words.

The road to health is equally as simple. Hufeland pointed it out in what might be boiled down to a very few words: Breathe pure air; an equable climate; don't worry; and don't eat or drink more than you need. Conditions in the air that favored free ventilation were the pre-

requisites with Hufeland, Sydenham, Rush, and those of that class who may be said to be canonized and sanctified in the heart of our profession.

The space of this paper will not permit a discussion of the mechanical means. The literature on the subject is ample. Billings, Leeds, Eassie, and the hygienic works of Buck and Parker, are about complete on the subject. The enlarged edition of the lecture delivered by Leeds in Philadelphia is a short treatise devoted to the elucidation of one system of ventilation.

Some six years ago, while preparing a lecture on ventilation which was to be delivered before a meeting of the Teachers' Institute at San Diego, I prepared a small wood and tin framed house, with tin chimneys and glass sides and roof, which I used during the lecture. This was done on the Leeds system, with the aid of small lamps for fires and different lengths of lighted tapers to represent persons—manufacturing different atmospheres that were introduced into the house. This gave me such a good opinion of the system, that I afterwards incorporated it in a residence I built, and have every reason to be well pleased with it.

Before closing, it would be well to suggest that ventilation is not by any means always health, or even life. An intelligent supervision and understanding are here absolutely necessary. The four Judges and thirty-six persons who died of putrid fever contracted at the Old Bailey, were those who sat in the best ventilated part of the room, *but right in the track of the foul air as it was making its exit from the room.* Here ventilation, by its unintelligent observance, made deaths. These are the cases already mentioned as quoted from Sir John Pringle by Guy. Hartley quotes an apartment in a London house which was all right unless a fire was lit in the fireplace, which then ventilated the room. On investigation, it was found that the suction caused the filtering of air through a side wall, and that in contact with this wall there was an old dust bin, which accounted for the bad odors in the room as soon as the fire caused a current up the chimney.* So that evidently great care must be exercised over the source of the ventilation.

Aside from the above, it must not be overlooked that a whole locality, or even a city, may at times be so imperfectly ventilated as to be dangerous to life. Considering the extent of the broad canopy of the heavens and the miles of extent of atmospheric air, this may sound hypothetical and impossible, but it has nevertheless occurred.

In the second week of December, 1873, the city of London was visited by one of the densest fogs it had ever experienced. The free escape of the smoke and the proper diffusion of gases were so materially interfered with, that all the emanations from the thousands of smokestacks, chimneys, and its millions of lungs and all other sources of effluvia, were necessarily prevented from being dissipated, and were retained either in the houses or on respiratory levels.

The result of this condition is well seen in the Registrar-General's report, which shows that this state of the metropolitan atmosphere was not only the means of causing an enormous death-rate, but was also the means of producing a large number of premature labors as well, for the returns gave, for the week ending December 20th, one hundred and eight more births than the average number, and seven hundred and eighty more deaths than there had been for any one week in the previous ten years, after making all due allowance for the increase of population.

* Hartley. Air in its Relations to Life.

That it was the atmospheric condition that induced these morbid changes may well be believed, from the fact that from the London "Times" of the 11th and 12th of that month (the fog occurred on the 9th and 10th) we have an account of the doings of the "Smithfield Club Cattle Show," then in operation. We there learn that the show was interfered with by the sickness and mortality among the animals, many of whom were only saved by being hurriedly sent out into the uncontaminated air of the country. What foul air will do can well be surmised when the Registrar-General's report shows that the mortality of the week above mentioned far exceeded the mortality of the cholera week in the fall of 1866.

A proper realization of the fact that man was not built so that he should respire about twenty times per minute for amusement or luxury is evidently the last thing that strikes the laity. How far in different directions this total disregard of what nature has intended has affected us injuriously is not appreciated, any more than does our profession realize the harm that results from our attributing therapeutic effects to agents here or there, when the results are purely to be attained by a strict attention to the condition of the first and main element of the Hippocratic trilogy—air. This is well exemplified on the Italian Riviera, where the north German or Russian comes for *the climate alone*, but is so utterly indifferent to the quality of the air that he breathes, that, by the means of the box stove of the fatherland and the liberal use of caulking material industriously inserted wherever a crevice might allow the ingress of a little fresh air, he converts as nearly as possible the condition of the air of his apartment to that of the air he left behind near the far northern Baltic shores.*

With a proper appreciation of the many propositions set forth in this paper, we would have far less to contend with against quackery, as, by a better realization of the causes of disease, the laity would be lifted out of the narrow and contracted limits they now occupy in their belief in the wonderful efficacy of this or that drug, or in their insane worship of the many "isms" that disgrace the field of medicine, and which have nothing but the ignorance of the otherwise better informed laity for a stable foundation. The subject is one of the deepest interest to all, but one that the patriot, the philanthropist, and the statesman cannot neglect, for it has been said that the race which has the strongest vitality and the longest resistance to decay and death must in the end become dominant.†

The day may not be far distant when the State may need that its citizens shall all have healthy physiques. Without being unnecessarily alarmists, we cannot wholly shut our eyes to the fact that to the west there exist a horde of semi-barbarians, numerically infinitely superior to our nation, who live in a far less productive country, and who are lately making rapid progress in all that is advantageous in European civilization, and who are also fast adopting all the recent advances in the art and systems of warfare. Like to the ancient Briton, we have called these *outré-mer* barbarians to our shores, and have made them acquainted with the greater fertility of our fields, our more genial climate and richer mineral resources, and our more desirable food supplies. We have been obliged to resort to law enactments and diplomacy already, to curb

* Bennet. Pulmonary Consumption.

† Richardson. Diseases of Modern Life.

the migratory impetus that all this knowledge has caused. Diplomatic fencing generally precedes that of the sword: it may be a long or a short interval, but the latter extreme is reached sooner or later. England has Australia, South Africa, and her immense Canadian possessions as a resort for her superfluous population; Germany, France, and Italy have not so great an excess beyond their power to support but that it imperceptibly filters into the United States, to become incorporated as part of our population; but China does not amalgamate, nor has she a locality for her overflow. So that not only as philanthropists and as Christians do we owe something in the shape of fostering care to our poorer brother, but as statesmen we must realize that the poorer brother is really the strength and supporter of the nation, and that in time of need he is its real protector.

As a remedy to all of the above possible evils, which are not alone probable, but are even now actual, daily occurrences, I would suggest a little more attention to matters of practical importance when a house is being constructed. If one tenth of the attention that is paid to the proper *outer* appearance, as to the disposition of gables, windows, gim-cracks, and gingerbread work, or to the devising of bewildering and blinding fantastically colored windows, were given to placing the house in a proper sanitary condition as regards ventilation, mankind, society, and the State would all be the gainers. As it is, however, most persons, knowing very little about ventilation or its benefits, or of the risks they and theirs run through unventilation, but little attention is paid to it, and necessarily and naturally no importance whatever is paid to the matter.

Many people foolishly imagine that, because they open their rooms to the air for a few hours daily—when the winds, dust, rain, or outside temperature does not interfere with their doing so—that they have complied with all the requirements demanded by health or by the body. The proper time to ventilate is when you are at home, and especially when the process of reparation are most active—this is when you are asleep. Then, again, the laity, by an erroneous conclusion they have somehow arrived at, have formed and cultivated the habit of carefully and hermetically housing the very classes that need all the benefits of ventilation the most—these being the young and very aged. The latter, especially, should be in well-ventilated apartments, especially if any young children are with them.

Very few of our school houses are built or constructed with any view to ventilation, except *outside of school hours*. During the time that the children are in school, ventilation has to take "pot-luck" chances on an occasional opening door. I have, at times, entered the room in school houses that have cost as much as \$35,000, *half an hour* after the departure of the children, and although the windows were opened *after school*, the offensive odor peculiar to animal effluvia was still very disagreeably present. And yet the School Boards of the city thought that they had well done their duty by the children and the citizens. The children with headaches and other derangements arising from poor ventilation that I have individually treated, show but too well the effects of a foul air. The architect did make a *pretense* at ventilation, but that was all that was really accomplished.

All public buildings, of whatsoever sort or for whatsoever purpose, should only be constructed under strict inspection, and after the approval of the plans by a Board of competent sanitarians, composed of men

skilled in sanitary construction and engineering. The slipshod way in which these affairs are now managed is unworthy of the nineteenth century, and of a nation that should set a better example. The schools above mentioned are but nurture beds for neurotics, and are as deficient, so far as their sanitary condition is concerned, as any building can be that is only ventilated when it is unoccupied. A building which is only ventilated at those times, can in no sense be termed even passably perfect in any hygienic sense.

One great drawback to properly ventilating buildings I find to consist in the fact that they are constructed with an utter disregard to the requirements of climate, either in the material used, exposure of building, and the attempt to mix up the means of lighting with those of ventilation—something which should be entirely separate. This utter disregard of climatic conditions cannot always be made with impunity, and I have seen various and ineffectual attempts to introduce some very primitive and impractical system of ventilation into public buildings some years *after* they had been in use; one of these being a Masonic hall and the other a court house. Had these been school houses, the utter want of ventilation would not have been noticed, as teachers are supposed to be in a normal condition if with headache and a backache, under any and all circumstances, and children very seldom complain; but in the event of any sickness, epidemic, or the critical period of existence in a girl's life, the want of ventilation, from which the system has suffered, is then very plainly discernible.

I would make it as a suggestion that no building for public use, be it church, theater, hall, school, or hospital, nor administrative buildings for State, county, or municipality, be constructed or allowed to be constructed until its plans are submitted to and approved by a competent Board of sanitarians. I would even go further—as it is a well-recognized principle that cities require “lungs,” or parks, and commons, not in the suburbs, or outskirts, but in their most populous places—that no one should be allowed to plat out a town, designed for the congregation of a population, without said plat being also submitted to a like competent sanitary Board for examination and approval—as the relation of the lay of the streets to compass points and the prevailing winds, and the proper laying out of alleys, and parks, width of streets, as demanded by the latitude, and regulation as to height of buildings, and all matters that affect the health and length of life of its future dwellers. It seems as if it were the height of absurdity for a city to have to contend with the work of marplots and botches for centuries to come, when it should not have been allowed to start wrong in the first instance. The simple fact that we are a republic, is no reason for such irrational and primitive methods. Old European cities and towns are now at great expense undergoing the haphazard and marplot work of the middle ages, and it would seem as if we might at least profit by their example, and not perpetuate tenth or sixteenth century blunders, which, I am very sorry to have to remark, is precisely what we are doing.

The State, county, and municipality must first set a hygienic example on these matters, and the supervision must further be carried into the construction of all public buildings. From these starting points the good work will reach the villa and the cottage, and we will then be better morally as well as physically. These are matters that should occupy the minds of our statesmen. It will lessen the needs and expense of penitentiaries, reformatories, jails, asylums, and hospitals.

SANITARY LAWS OF THE STATE OF CALIFORNIA.

POLITICAL CODE.

PART III—Of the Government of the State.

TITLE VII—General Police of the State.

CHAPTER I.

IMMIGRATION.

- SECTION 2952. Lepers, lazarettos for.
2955. Examination and disposition of lepers. Fees.
2959. Fines and penalties, lien on vessel.
2960. Other commutations.
2962. Certain vessels exempted.
2965. Ex officio Commissioners.
2968. Bond of Commissioner.

SEC. 2952. It shall not be lawful for lepers, or persons affected with leprosy or elephantiasis, to live in ordinary intercourse with the population of this State; but all such persons shall be compelled to inhabit such lazarettos or lepers' quarters as may be assigned to them by the Board of Supervisors of the city or county in which they shall be domiciled or settled; and the Board of Supervisors are vested with power and are required to make all necessary provisions for the separation, detention, and care of lepers, or persons affected with leprosy or elephantiasis, settled or domiciled in their respective cities or counties. The Superintendent or manager of all lepers' quarters under this chapter shall forward quarterly statements, showing the name, age, sex, and birthplace of each leper in such quarter, to the Secretary of State, who shall keep a proper record of such matters for the information of the public. [In effect March 25, 1876.]

SEC. 2955. The Commissioner of Immigration must satisfy himself whether or not any person who shall arrive in this State by vessel from any foreign port or place is a leper, or affected with the disease known as leprosy or elephantiasis, before such person shall mingle with the population of this State. For the purpose of ascertaining said fact the Commissioner is vested with the power and authority to detain such persons on board any such vessel so arriving, and to assign the vessel to a berth or anchorage separate and apart from other vessels, and at a safe and suitable distance from the shore, if in his judgment it shall be necessary, until such fact can be fully ascertained by him. Such fact shall be ascertained by personal inspection and examination of each and every person on board such vessel; and the Commissioner of Immigration is authorized, empowered, and required to make such personal inspection and examination of all persons so arriving by any such vessel, the same to be made at such berth or anchorage as he shall, in his

discretion, assign to such vessel for that purpose, and shall be made before the landing of any person thereupon. All of such persons who, upon inspection and examination, are found to be lepers, or affected with the disease known as leprosy or elephantiasis, shall be taken in charge by the Commissioner of Immigration, and placed in a suitable lazaretto, or lepers' quarters, to be provided or designated by the Board of Supervisors, whenever necessary for that purpose, as hereinbefore prescribed, and there detained and properly cared for, separate and apart from the general population of this State, so long as they, the said lepers, shall elect to remain in the State of California, or until they shall have recovered from said disease, and no longer. All of such persons as shall be found to be free from said disease shall be allowed to depart and go at their will, without unnecessary detention or delay, and shall be entitled to receive a certificate of the fact of their freedom from said disease from said Commissioner. For his services in making such examination and inspection the Commissioner of Immigration shall demand and collect from the master, owner, or consignee of such vessel the sum of seventy cents, in United States gold or silver coin, for each and every person so examined or inspected, which sum, except four thousand dollars a year and expenses of office, shall, when required for such purpose, be paid by the Commissioner into the State Treasury, to be used in the maintenance, when necessary, of such lazarettos or lepers' quarters as shall be constructed under this law. Any master, owner, or consignee of any vessel arriving at any port of this State who shall fail or refuse to perform, or permit the performance of, any of the acts or things required by this chapter, or to take and occupy with his vessel the berth or anchorage assigned for the same by the Commissioner, pending the examination and inspection herein provided for, or who shall permit or allow any person arriving in such vessel to depart therefrom, and to communicate, mingle, or associate with the population of this State, or any part thereof, until after such examination and inspection by the Commissioner is had, shall, for every such act or omission, forfeit to the Commissioner of Immigration the sum of one thousand dollars in United States gold coin, to be sued for and recovered by suit in any Court of competent jurisdiction, and to be applied in like manner with the fees. And any master, owner, or consignee of any such vessel so arriving, who shall refuse or neglect to pay, or cause to be paid to said Commissioner, the fee of seventy cents for the examination and inspection of each and every person so arriving in such vessel, shall forfeit to said Commissioner, for each case, the sum of five hundred dollars in United States gold coin, to be recovered and applied as above. And the Commissioner shall have a lien upon the vessel, and the same shall be sold to pay any judgment recovered under this Act. The Commissioner shall have the power to call in the aid of the Sheriff and all police authorities to assist in enforcing this law. And he may appoint one or more deputies under him, who shall be vested with all the powers of the Commissioner, and may discharge his official duties when required by him. The Commissioner of Immigration must prepare and transmit to the Secretary of State quarterly statements, certified under his hand and seal, showing the name, age, sex, birthplace, and present residence of every leper, or person affected with leprosy or elephantiasis, examined or inspected by him, as well as any other infor-

mation or fact touching the character and prevalence of said disease within his knowledge. [In effect March 25, 1876.]

SEC. 2959. For all fines and penalties imposed by this chapter upon any master or commander, owner or consignee, for any omission, neglect, or refusal to perform any act or duty required by this chapter, such vessel is liable; and the amount of such fines or penalties are a lien upon such vessel, and have priority over all other liens, except those for seamen's wages, bottomry bonds, and respondentia. Such penalties and fines may be sued for and recovered in a civil action, with costs of suit, by the Commissioner, or by his authorized attorney, in the name of the people of the State of California, in any Court having cognizance thereof, and when recovered must, after deducting the expenses, be paid into the State Treasury.

SEC. 2960. The Commissioner may compound or commute, for any of the penalties or fines, upon such terms as he thinks proper, and at the end of every month report to the Controller of State the reasons and causes of such compounding or commutation. * * *

SEC. 2962. Masters of vessels arriving at any of the ports of this State from any port in this State, or from Oregon or Washington Territory, are exempt from making the statement required by this chapter, when the vessels in which they arrive have not taken on board at their port of departure, or at any intermediate port, any alien passenger, to be landed at the port of arrival; and masters of vessels arriving from Panama are also exempted from the provisions of this chapter, when they have not landed, or are not about to land, passengers who took their departure from ports other than the port of New York; and in no case must such master be required to report any passenger other than way passengers taken on board between the port of New York and the port of arrival in this State.

SEC. 2963. The Consuls, Ministers, agents, or other public functionaries of any foreign Government, arriving in this State in their official capacity, are exempt from the provisions of this chapter.

SEC. 2964. The Commissioner of Immigration must approve all bonds and administer all oaths required in the discharge of his duties. Whenever it appears that the master or commander of any vessel has not made a full and correct report, as provided by this chapter, the Commissioner must inquire into the same, and for that purpose may require the attendance of witnesses before him in the same manner as Notaries Public may in civil cases. Testimony so taken may be read as evidence on the trial of any action commenced for any penalty or forfeiture accruing under the provisions of this chapter in the same manner, and with like effect, as if regularly taken in such action.

SEC. 2966. In all the ports in this State, other than San Francisco, the Mayor or chief municipal officer at such port, or if there be none such, then the Sheriff of that county, is ex officio Commissioner of Immigration for such port, and in carrying out the provisions of this chapter, and has all the powers and is liable to all the penalties provided herein.

SEC. 2968. The Commissioner of Immigration for the port of San Francisco must execute an official bond in the sum of twenty-five hundred dollars. [In effect March 25, 1876.]

CHAPTER II.

PRESERVATION OF PUBLIC HEALTH.

ARTICLE I. STATE BOARD OF HEALTH.

- II. VACCINE AGENT.
- III. HEALTH AND QUARANTINE REGULATIONS FOR THE CITY AND HARBOR OF SAN FRANCISCO.
- IV. HEALTH REGULATIONS FOR THE CITY OF SACRAMENTO.
- V. HEALTH AND QUARANTINE OF OTHER CITIES, TOWNS, AND HARBORS.

ARTICLE I.

STATE BOARD OF HEALTH.

- SECTION 2978. Who constitute the State Board.
2979. Duties of.
2980. To report as to the effect of intoxicating liquors.
2981. Meetings, and election of officers.
2982. Duties of Secretary. Salary of Secretary.
2983. Expenses of, limited.

SEC. 2978. The State Board of Health consists of seven physicians—two of the city of Sacramento, and five from other portions of the State—appointed by the Governor for the term of four years.

SEC. 2979. The State Board of Health must place themselves in communication with the local Boards of Health, hospitals, asylums, and public institutions throughout the State, and take cognizance of the interests of health and life among the citizens generally. They must make sanitary investigations and inquiries respecting the causes of disease, especially of epidemics, the source of mortality, and the effects of localities, employments, conditions, and circumstances on the public health, and gather such information in respect to these matters as they may deem proper for diffusion among the people. They may devise some scheme whereby medical and vital statistics of sanitary value can be obtained, and act as an advisory Board to the State in all hygienic and medical matters, especially such as relate to the location, construction, sewerage, and administration of prisons, hospitals, asylums, and other public institutions. They must, at each biennial session of the Legislature, make a report, with such suggestions as to legislative action as they deem proper.

SEC. 2980. The Board must examine into and report what, in their best judgment, is the effect of the use of intoxicating liquor as a beverage upon the industry, prosperity, happiness, health, and lives of the citizens of the State; also, what legislation, if any, is necessary in the premises.

SEC. 2981. The Board must meet at the capital of the State, at least once in every three months. They must elect from their own number a President and a Permanent Secretary; the latter must reside at the capital, and is their executive officer. No member, except the Secretary, receives any compensation; but the actual traveling expenses of the members, while engaged in the duties of the Board, are allowed, and paid out of the General Fund.

SEC. 2982. The Secretary must superintend the work and perform such other duties as the Board may require. He must furnish the Legislature, when in session, such information cognate to this chapter as, from time to time, may be necessary. An annual salary of twenty-five hundred dollars, and his office and other necessary expenses in-

curred in the performance of his duties, must be paid to him in the same manner as salaries of State officers are paid.

SEC. 2983. The expenses of the Board, including the salary of the Secretary, must not exceed four thousand dollars per annum.

ARTICLE II.

VACCINE AGENT.

SECTION 2993. Agent to obtain genuine vaccine matter.

2994. Compensation and duty of.

SEC. 2993. The Vaccine Agent must obtain a supply of the genuine vaccine matter, and preserve the same for the use and benefit of the citizens of the State. [Basis of article: Stats. 1852, p. 138.]

SEC. 2994. Such agent must furnish genuine vaccine matter, approved by the State Board of Health, to any regular practicing physician in good standing in his profession in this State. He may charge and receive for every parcel of vaccine matter furnished, the sum of five dollars, which is full compensation for his services and expenses.

ARTICLE III.

HEALTH AND QUARANTINE REGULATIONS FOR THE CITY AND HARBOR OF SAN FRANCISCO.

- SECTION 3004. Quarantine grounds, location of.
 3005. Board of Health of San Francisco.
 3006. Mayor ex officio President. Time of meeting.
 3007. Health Officer. His election.
 3008. Powers of.
 3009. Appointment of certain officers.
 3010. Compensation of officers and employés.
 3011. Expenses of Health Officer.
 3012. General powers of Board of Health.
 3013. Shipmasters to report infected vessels.
 3014. Passengers and freight; permit to land.
 3015. Duties of pilots.
 3016. Penalty for neglect of masters.
 3017. Vessels subject to quarantine.
 3018. Examination and inspection of vessels.
 3019. Passengers not to be landed without permit.
 3020. Fees of Quarantine Officer.
 3021. Compulsory vaccination.
 3022. Hospitals to be provided.
 3023. Records of births, deaths, and interments.
 3024. Returns of births, deaths, etc., of children.
 3025. No bodies to be interred without permit.
 3026. Returns of interments to be made.
 3027. Bodies not to be removed without permit.
 3028. Nuisances on premises of non-residents.
 3029. Health Officer to keep fee-book.
 3030. Bond of Health Officer.
 3031. Officers empowered to administer oaths.
 3032. Actions, in whose name maintained.
 3033. Vacation of infected and dangerous houses.
 3034. Physicians to report infectious diseases.
 3035. Board of Health to have charge of cemetery.

SEC. 3004. The quarantine grounds of the bay and harbor of San Francisco are at the anchorage of Sausalito.

SEC. 3005. The Board of Health of the City and County of San Francisco consists of the Mayor of the city and county and four physicians in good standing, residing in the City and County of San Francisco, appointed by the Governor, and holding their offices for the term of five years.

SEC. 3006. The Mayor is ex officio President of the Board. The

Board must meet monthly, and at such other times as the President may direct. In the absence of the President, the Board may elect a Chairman, who is clothed with the same powers as the President.

SEC. 3007. The Health Officer for the City and County and Port of San Francisco is elected by the Board of Health, and holds office at its pleasure. He must be a graduate of some medical college, in good standing, and must reside within the city limits of San Francisco.

SEC. 3008. The Health Officer is the executive officer of the Health Department, and he may, in his discretion, cause the removal to a hospital of any and all persons within the limits of the City and County of San Francisco, infected with variola. [In effect March 9, 1878.]

SEC. 3009. The Board of Health must appoint a Quarantine Officer, who shall be a physician in good standing; a Secretary, one Assistant Secretary, six Health Inspectors, one Market Inspector, and one Messenger, whose duties must be fixed by the Board of Health. They must also appoint one Superintendent Physician, one Resident Physician, one Steward, one Matron, one Apothecary, two Visiting Physicians, two Visiting Surgeons, as officers of the City and County Hospital, in and for the City and County of San Francisco; one each of said Visiting Physicians and Surgeons to be nominated by the Faculty of the Medical Department of the University of California, and one each of said Visiting Physicians and Surgeons to be nominated by the Medical College of the Pacific. Said Board may also appoint one Engineer for the City and County Hospital. They may also appoint one Superintendent, one Resident Physician, one Matron, and such other employes as are now authorized by law, to be employed in and for the Almshouse of said city and county. They shall also have power to appoint and prescribe the duties of one City Physician and one Assistant City Physician, who shall be designated as Police Surgeons, and whose duty it shall be to make all autopsies required of them by the Coroner of said city and county. And said Board is also empowered to appoint such employes and such medical attendants as they may deem necessary in the Health Department, and in all the various institutions which are by law placed under their supervision; and the compensation of such employes and medical attendants shall be fixed by the Board of Health. The appointing power aforesaid is vested solely in said Board of Health, and said Board shall have power to prescribe the duties of said appointees, and shall not remove the same without just cause. The heads of departments appointed by the Board of Health, to wit: the Health Officer, Resident Physician of City and County Hospital, and Superintendent of Almshouse, shall not be removed except by a concurrence of four members of said Board of Health.

SEC. 3010. The following annual salaries are hereby allowed to the officers of the Health Department, and such other officers and employes as are mentioned in the preceding section, viz.: Health Officer, three thousand dollars; Quarantine Officer, eighteen hundred dollars; Secretary, two thousand one hundred dollars; Assistant Secretary, one thousand two hundred dollars; Health Inspectors, one thousand two hundred dollars each; Market Inspector, one thousand two hundred dollars; Messenger, nine hundred dollars; City Physician, one thousand eight hundred dollars; Assistant City Physician, one thousand two hundred dollars; all of said salaries, together with the salaries of such other employes of the Health Department as may be appointed by the Board

of Health, must be paid in equal monthly installments out of the General Fund of the City and County of San Francisco, in the same manner as the salaries of the other officers of said city and county are paid. There shall be paid to the officers and employes of the City and County Hospital and Almshouse the following annual salaries, viz.: Superintendent Physician, two thousand four hundred dollars; Resident Physician, one thousand five hundred dollars; Steward, one thousand five hundred dollars; Matron, seven hundred and twenty dollars; one Apothecary, one thousand two hundred dollars; Visiting Physicians and Surgeons, one thousand two hundred dollars each; Engineer, one thousand two hundred dollars; Superintendent of Almshouse, two thousand four hundred dollars; Matron of Almshouse, seven hundred and twenty dollars; and all other medical attendants and employes of said institutions are to be paid such sums as may be authorized by law, and as provided in the preceding section; all to be paid in equal monthly installments, out of the Hospital and Almshouse Fund of said City and County of San Francisco; and the Auditor of said city and county is hereby directed to audit the said demands, payable out of the funds aforesaid, upon the approval of the same by the said Board of Health, and also to audit all demands for salaries of medical attendants and employes appointed by the Board of Health in accordance with this chapter, for the amounts authorized to be paid, when the same shall have been approved by said Board; and the Treasurer of said city and county must pay said demands out of said funds. The Clerk of the Mayor of the City and County of San Francisco shall not receive any compensation as Clerk of the Board of Health. [In effect March 9, 1878.]

SEC. 3011. The Health Officer, in addition to his salary, receives such sums for the necessary expenses of his office as the Board of Health may direct, and the Auditor must audit and the Treasurer pay such sums out of the General Fund. The Board of Supervisors must provide proper offices for the Health Department.

SEC. 3012. The Board of Health have general supervision of all matters appertaining to the sanitary condition of the city and county, including the City and County Hospital, the County Jail, Almshouse, Industrial School, and all public health institutions provided by the City and County of San Francisco; and may adopt such orders and regulations, and appoint or discharge such medical attendants and employes as to them seems best to promote the public welfare; and may appoint as many Health Inspectors as they deem necessary in time of epidemics.

SEC. 3013. Shipmasters bringing vessels into the harbor of San Francisco, and masters, owners, or consignees having vessels in the harbor which have on board any cases of Asiatic cholera, smallpox, yellow typhus, or ship fever, must report the same, in writing, to the Quarantine Officer before landing any passengers, casting anchor, or coming to any wharf, or as soon thereafter as they, or either of them, become aware of the existence of either of the diseases on board of their vessels. [In effect March 9, 1878.]

SEC. 3014. No Captain or other officer in command of any vessel sailing under a register arriving at the port of San Francisco, nor any owner, consignee, agent, or other person, having charge of such vessel, must, under a penalty of not less than one hundred dollars, nor more

than one thousand dollars, land, or permit to be landed, any freight, passengers, or other persons from such vessel until, he has reported to the Quarantine Officer, presented his bill of health, and received a permit from that officer to land freight, passengers, or other persons. [In effect March 9, 1878.]

SEC. 3015. Every pilot who conducts into the port of San Francisco any vessel subject to quarantine, or examination by the Quarantine Officer, must—

First—Bring the vessel no nearer the city than is allowed by law;

Second—Prevent any person from leaving and any communication being made with the vessel under his charge until the Quarantine Officer has boarded her and given the necessary orders and directions;

Third—Be vigilant in preventing any violation of the quarantine laws, and report without delay all such violations that come to his knowledge to the Quarantine Officer;

Fourth—Present the master of the vessel with a printed copy of the quarantine laws, unless he has one;

Fifth—If the vessel is subject to quarantine, by reason of infection, place at the mast-head a small yellow flag. [In effect March 9, 1878.]

SEC. 3016. Every master of a vessel subject to quarantine or visitation by the Quarantine Officer, arriving in the port of San Francisco, who refuses or neglects, either—

First—To proceed with and anchor his vessel at the place assigned for quarantine, when legally directed so to do; or,

Second—To submit his vessel, cargo, and passengers to the Quarantine Officer, and furnish all necessary information, to enable that officer to determine what quarantine or other regulations they ought, respectively, to be subject; or,

Third—To report all cases of disease and of deaths occurring on his vessel, and to comply with all the sanitary regulations of the bay and harbor—

Is liable in the sum of five hundred dollars for every such neglect or refusal. [In effect March 9, 1878.]

SEC. 3017. All vessels arriving off the port of San Francisco from ports which have been legally declared infected ports, and all vessels arriving from ports where there is prevailing, at the time of their departure, any contagious, infectious, or pestilential diseases, or vessels with decaying cargoes, or which have unusually foul or offensive holds, are subject to quarantine, and must be, by the master, owner, pilot, or consignee, reported to the Quarantine Officer without delay. No such vessel must cross a right line drawn from Meigs Wharf to Alcatraz Island until the Quarantine Officer has boarded her and given the order required by law. [In effect March 9, 1878.]

SEC. 3018. The Quarantine Officer must board every vessel subject to quarantine or visitation by him, immediately on her arrival, make such examination and inspection of vessel, books, papers, or cargo, or of persons on board, under oath, as he may judge expedient, and determine whether the vessel should be ordered to quarantine; and, if so, the period of quarantine. [In effect March 9, 1878.]

SEC. 3019. No Captain or other officer in command of any passenger-carrying vessel of more than one hundred and fifty tons burden, nor of any vessel of more than one hundred and fifty tons burden having passengers on board, nor any owner, consignee, or other person having

charge of such vessel or vessels, must, under a penalty of not less than one hundred dollars, nor more than one thousand dollars, land or permit to be landed any passenger from the vessel, until he has presented his bill of health to the Quarantine Officer, and received a permit from that officer to land such passengers, except in such cases as the Quarantine Officer deems it safe to give the permit before seeing the bill of health. [In effect March 9, 1878.]

SEC. 3020. The following fees may be collected by the Quarantine Officer: For giving a permit to land freight or passengers, or both, from any sailing vessel of less than five hundred tons burden from any port out of this State, two dollars and fifty cents; over five hundred and under one thousand tons burden, five dollars; each additional one thousand tons burden, or fraction thereof, an additional two dollars and fifty cents. For steam vessels propelled in whole or in part by steam, of one thousand tons burden or less, five dollars, and two dollars and fifty cents for each additional one thousand tons burden, or fraction thereof; but vessels not propelled in whole or in part by steam, sailing to and from any port or ports of the Pacific States of the United States or Territories, and whaling vessels entering the harbor of San Francisco, are excepted from the provisions of this section. [In effect March 9, 1878.]

SEC. 3021. The Board of Health may enforce compulsory vaccination on passengers in infected ships, or coming from infected ports.

SEC. 3022. The Board of Health may provide suitable hospitals, to be situated at or near Sausalito, and furnish and supply the same with nurses and attachés, and remove thereto all persons afflicted with cholera, smallpox, yellow, typhus, or ship fever.

SEC. 3023. The Health Officer must keep a record of all births, deaths, and interments occurring in the City and County of San Francisco. Such records, when filled, must be deposited in the office of the County Recorder, and produced when required for public inspection.

SEC. 3024. Physicians and midwives must, on or before the fourth day of each month, make a return to the Health Officer of all births, deaths, and the number of still-born children occurring in their practice during the preceding month. In the absence of such attendants, the parent must make such report within thirty days after the birth of the child. Such returns must be made in accordance with rules adopted, and upon blanks furnished by the Board of Health. [In effect March 9, 1878.]

SEC. 3025. No person shall deposit in any cemetery, or inter in the City and County of San Francisco, any human body without first having obtained and filed with the Health Officer a certificate signed by a physician or midwife, or a Coroner, setting forth, as near as possible, the name, age, color, sex, place of birth, occupation, date, locality, and cause of death of the deceased, and obtain from such Health Officer a permit; nor shall any human body be removed or disinterred without the permit of the Health Officer, or by order of the Coroner. Physicians, when deaths occur in their practice, must give the certificate herein mentioned. Hereafter it shall be the duty of the Assistant City Physician or Police Surgeons to perform all autopsies which may be required in the Coroner's office of the City and County of San Francisco, all such autopsies being made without charge to the city. It shall be the duty of the Health Officer to see that the dead body of a human being is not allowed to remain in any public receiving vault for a longer

period than five days. At the expiration of that time he shall cause the body to be placed in a vault or niche constructed of brick, stone, or iron, and hermetically sealed. It shall also be his duty to require all persons having in charge the digging of graves and burial of the dead, to see that the body of no human being who had reached ten years of age shall be interred in a grave less than six feet deep, or if under the age of ten years, the grave to be not less than five feet deep. [In effect March 9, 1878.]

Sec. 3026. Superintendents of cemeteries within the boundaries of the City and County of San Francisco must return to the Health Officer, on each Monday, the names of all persons interred or deposited within their respective cemeteries for the preceding week. [In effect March 9, 1878.]

Sec. 3027. No Superintendent of a cemetery can remove or cause to be removed, disinter or cause to be disinterred, any corpse that has been deposited in the cemetery, without a permit from the Health Officer, or by order of the Coroner.

Sec. 3028. Whenever a nuisance shall exist on the property of any non-resident, or any property, the owner or owners of which cannot be found by the Health Inspector after diligent search, or on the property of any owner or owners upon whom due notice may have been served, and who shall for three days refuse or neglect to abate the same, or on any city property, it shall be the duty of the Board of Health to cause the said nuisance to be at once removed or abated, and to draw upon the General Fund for such sums as may be required for its removal or abatement, not to exceed two hundred dollars; *provided*, that whenever a larger expenditure is found necessary to be made for the removal or suppression of any nuisance, the Board of Supervisors of said city and county shall, upon the written application of the Board of Health, by ordinance, appropriate, allow, and order paid out of the General Fund, such sum or sums as may be necessary for that purpose; and the Auditor shall audit, and the Treasurer shall pay, all appropriations of money made in pursuance of this section, in the same manner as is now provided by law for auditing and paying demands upon the treasury; said sum or sums so paid shall become a lien on the property from which said nuisance has been removed or abated, in pursuance of this section, and may be recovered by an action against such property. And it shall be the duty of the City and County Attorney to foreclose all such liens in the proper Court, in the name of and for the benefit of said city and county, and when the property is sold, enough of the proceeds shall be paid into the City and County Treasury to satisfy the lien and costs; and the overplus, if any there be, shall be paid to the owner of the property, if he be known, and if not, then into the Court for his use when ascertained. The Board of Health is hereby vested with power to act upon, define, determine, and adjudge what shall constitute a nuisance in said city and county, and to require the same to be abated in a summary manner. Any person who maintains, permits, or allows a nuisance to exist upon his or her property or premises after the same has been determined by said Board to be a nuisance, and after notice to remove the same has been served upon such person, is guilty of a misdemeanor, and shall be punished accordingly; and each day of such existence, after notice, shall be deemed a separate and distinct offense; and it is the duty of the Health Officer to prosecute all persons

guilty of violating this law by continuous prosecutions until the same is abated and removed. [In effect March 9, 1878.]

SEC. 3029. The Health Officer must keep in his office a book in which he must make an entry of all fees collected by him. He must pay all fees collected to the City and County Treasurer weekly, to the credit of the General Fund.

SEC. 3030. The Health Officer must execute an official bond, to be approved by the Board of Health, in the sum of ten thousand dollars.

SEC. 3031. Any member of the Board of Health, Health Officer, or Quarantine Officer, or Secretary, or Assistant Secretary of the Health Department, is empowered to administer oaths on business connected with that department. [In effect March 9, 1878.]

SEC. 3032. Whenever any cause of action arises under any of the provisions of this chapter, suit may be maintained therein in the name of the Health Officer, in any District Court of this State.

SEC. 3033. Whenever it shall be certified to the Board of Health, by the Health Officer, that any building or part thereof is unfit for human habitation, by reason of its being so infected with disease as to be likely to cause sickness among the occupants, or, by reason of its want of repair, has become dangerous to life, said Board may issue an order and cause the same to be affixed conspicuously on the building, or part thereof, and to be personally served upon the owner, agent, or lessee. if the same can be found in this State, requiring all persons therein to vacate such building, for the reasons to be stated therein as aforesaid. Such building, or part thereof, shall, within ten days thereafter, be vacated; or within such shorter time (not less than twenty-four hours), as in said notice may be specified; but said Board, if it shall become satisfied that the danger from said house, or part thereof, has ceased to exist, may revoke said order, and it shall thenceforward become inoperative. [In effect March 9, 1878.]

SEC. 3034. *First*—Every physician in the city and county shall report to the Health Officer, in writing, every patient he shall have laboring under Asiatic cholera, variola, diphtheria, or scarlatina, immediately thereafter, and report to the same officer every case of death from such disease immediately after it shall have occurred.

Second—Every householder in said city and county shall forthwith report in writing, to the Health Officer, the name of every person boarding, or inmate, at his or her house, whom he or she shall have reason to believe sick of cholera or smallpox, and any deaths occurring at his or her house from such disease. [In effect March 9, 1878.]

SEC. 3035. The Board of Health shall have entire charge of the City Cemetery, and shall employ a Superintendent, at a salary of seventy-five dollars per month, the same to be paid as the salaries of other employés are paid. [In effect March 9, 1878.]

ARTICLE IV.

HEALTH REGULATIONS FOR THE CITY OF SACRAMENTO.

- SECTION 3042. Board of Health, who and how appointed.
3043. Term of office.
3044. Powers of the Board of Health.
3045. Pesthouses, how located and conducted.
3046. Death records.
3047. Enforcement of regulations. Health Officer.
3048. Expenses, how paid.
3049. Compensation, how paid.

SEC. 3042. The Board of Trustees of the city of Sacramento may establish by ordinance a Board of Health therefor, to consist of five practicing physicians, graduates of a medical college of recognized respectability; and the President of the Board of Trustees is ex officio President of the Board.

SEC. 3043. The members of the Board hold their offices at the pleasure of the appointing power.

SEC. 3044. The Board of Health of the city of Sacramento has a general supervision of all the matters appertaining to the sanitary condition of the city, and may make such rules and regulations in relation thereto as are not inconsistent with law.

SEC. 3045. The Board of Health may locate and establish pesthouses, and cause to be removed thereto, and kept, any person having a contagious or infectious disease; may discontinue or remove the same, and make such rules and regulations regarding the conduct of the same as are needful.

SEC. 3046. The Board of Health must exercise a general supervision over the death records of the city of Sacramento, and may adopt such forms and regulations for the use and government of physicians, undertakers, and Superintendents of Cemeteries, as in their judgment may be best calculated to secure reliable statistics of the mortality in the city, and prevent the spread of disease.

SEC. 3047. The Board of Trustees of the city of Sacramento must, by ordinance or otherwise, provide for enforcing such orders and regulations as the Board of Health may from time to time adopt; and in times of epidemics, or when deemed necessary by the Board of Health, a Health Officer must be employed to enforce the laws in relation to the sanitary condition of the city.

SEC. 3048. All expenses necessarily incurred in carrying out the provisions of this article must be provided for by the Board of Trustees of the city of Sacramento, who may make appropriation therefor out of the Special Street Fund, if the same is sufficient; if not, they may by taxation provide a fund therefor.

SEC. 3049. The Board of Trustees must fix the compensation of the Board of Health and the Health Officer.

ARTICLE V.

HEALTH AND QUARANTINE OF OTHER CITIES, TOWNS, AND HARBORS.

- SECTION 3059. Boards of Supervisors may adopt Article III.
 3060. Boards of Supervisors may adopt Article IV.
 3061. Board of Health established in towns and cities.
 3062. May appoint Health Officer in lieu of Board.
 3063. Per capita or property tax, how levied.

SEC. 3059. The Board of Supervisors of any county in which there is a port of entry or harbor, for which there is not otherwise provided health and quarantine regulations, may by an ordinance adopt the whole or any part of the provisions of article three of this chapter, appoint a Board of Health, or Health Officer, locate quarantine grounds when necessary, and provide for the enforcement of health and quarantine regulations.

[Local adaptation of health and quarantine regulations, see Sec. 4046, Sub. 20.]

SEC. 3060. In like manner the Board of Supervisors of any county in which there is an unincorporated city or town, for which there is not otherwise provided a Board of Health, or health regulations in time of epidemics or the existence of contagious or infectious diseases, may by an ordinance adopt for such city or town, in whole or in part, the provisions of article four of this chapter, for some definite period of time, and appoint therefor a Board of Health.

SEC. 3061. It shall be the duty of the Board of Trustees, Council, or other corresponding Board, of every incorporated town and city of this State, to establish, by ordinance, a Board of Health for such town or city to consist of five persons, one of whom at least shall be a practicing physician and a graduate of some reputable school of medicine, and one, if practicable, a civil engineer. The members of the Board shall hold their offices at the pleasure of the appointing power. Every local Board of Health established in this State must:

First—Supervise all matters pertaining to the sanitary condition of their town or city, and make such rules and regulations relative thereto as are necessary and proper, and not contrary to law.

Second—Report to the Secretary of the State Board of Health, at Sacramento, at such times as the State Board of Health may require:

- (a) The sanitary condition of their locality.
- (b) The number of deaths, with the cause of each, as near as can be ascertained, within their jurisdiction, during the preceding month.
- (c) The presence of epidemic or other dangerous, contagious, or infectious disease, and such other matters, within their knowledge or jurisdiction, as the State Board may require.

The Trustees, Council, or other legislative Board, by whatever name known, of any incorporated city or town of this State may, by ordinance, adopt any portion of article three and article four of this chapter, or either of them, for some definite period of time, as may seem proper for the regulation of sanitary matters within their town or city. [In effect March 19, 1878.]

[This Act shall not extend to any incorporated city or town, or city and county, for which health regulations and [are?] provided by special statutes.]

[Local adaptation of health laws, see Sec. 4046, Sub. 20; Sec. 4408, Sub. 18.]

[Section inapplicable to incorporated city, town, etc., for which health regulations provided by special statute, see Sec. 2 of Amendatory Acts in Stats. 1878, p. 56.]

SEC. 3062. The Board of Supervisors of each county must appoint, in each unincorporated city or town of five hundred or more inhabit-

ants, a Health Officer, who has all the duties and powers of the Board of Health and Health Officer, as specified in this and the two preceding articles. [In effect March 1, 1889, as amended.]

Sec. 3063. All necessary expenses of enforcing this article are charges against the counties, cities, or towns, respectively, for the payment of which the county, city, or town may levy a per capita tax of not exceeding three dollars, or a property tax of not exceeding one fourth of one per cent, yearly, until the same is paid.

Sec. 3064. The Board of Supervisors must fix the salary or compensation of Boards of Health or Health Officers, and provide for the expenses of enforcing the provisions of this article. If the Board of Supervisors or Board of Trustees, Council, or other corresponding Board of any incorporated town, neglect to provide a Board of Health or Health Officer by the first day of July, eighteen hundred and eighty-nine, the State Board of Health may direct the District Attorney of the county to begin an action against such Board of Supervisors, or Board of Trustees, or corresponding Board, to compel the performance of their duty, or may appoint a Board of Health, or Health Officer with the powers of a Board of Health, for such town or city, and the expenses of such Board of Health, or Health Officer, shall be a charge against the incorporated city or town for which such appointment shall be made; and when the appointment is made for unincorporated towns the expenses of the Board of Health, or Health Officer, are a charge against the county. [In effect March 1, 1889.]

CHAPTER III.

REGISTRY OF BIRTHS, MARRIAGES, AND DEATHS.

- SECTION 3074. Registry of marriages.
 3075. Registry of births.
 3076. Registry of deaths.
 3077. Reports to Recorder.
 3078. Same.
 3079. Duties of Recorder.
 3080. Report to the Secretary of State Board of Health.
 3081. Fees.
 3082. Penalties.
 3083. Printing and distribution of forms of register.

Sec. 3074. All persons who perform the marriage ceremony must keep a registry of the time of each marriage so celebrated, the residence, the names in full, the place of birth, the age of each party, and whether either party has ever been before married. [In effect March 16, 1878.]

Sec. 3075. All physicians and professional midwives must keep a registry of the time of each birth at which they assist professionally, the sex, race, and color of the child, and the names and residence of the parents.

Sec. 3076. Physicians who attend deceased persons in their last sickness, clergymen who officiate at a funeral, Coroners who hold inquests, sextons and undertakers who bury deceased persons, must each keep a registry of the name, age, residence, and time of death of such person. [Approved March 30th; in effect July 6, 1874.]

Sec. 3077. All persons registering marriages, births, or deaths, must

quarterly file with the County Recorder a certified copy of their register. All such certificates must specify, as near as may be ascertained, the name in full, age, occupation, term of residence in the city or county, birthplace, condition, whether single or married, widow, or widower, sex, race, color, last place of residence, and cause of death of all decedents. [In effect March 16, 1878.]

SEC. 3078. If at birth no physician or midwife attend, then the parents must make the report.

SEC. 3079. The Recorder must keep separate registers, to be known as the "Register of Marriages," the "Register of Births," and the "Register of Deaths," in which the marriages, births, and deaths certified to him must be numbered in the order in which they are reported to him. There must be stated in each register, in separate columns, properly headed, the various facts contained in the certificates, and the name and official or clerical position of the person making the report. The Recorder must carefully examine each report, and register the same marriage, birth, or death but once, although it may be reported by different persons. [In effect March 16, 1878.]

SEC. 3080. The County Recorder must, every three months, transmit to the Secretary of the State Board of Health, at Sacramento City, a certified abstract of the registers of births, marriages, and deaths, prepared in the manner prescribed in the instructions of the Secretary, and upon blanks to be furnished by him for that purpose.

SEC. 3081. County Recorders, in those counties where their compensation is by fees, shall be allowed by the Board of Supervisors a fee of not exceeding ten cents for each name reported, to be paid out of the General Fund of the county; and in those counties where their compensation is by a fixed salary, the duties in this chapter provided shall be performed without compensation other than such salary. [In effect March 16, 1878.]

SEC. 3082. Any person on whom a duty is imposed by this chapter who fails, neglects, or refuses to perform the same as herein required, is liable to a penalty of fifty dollars, to be recovered by the District Attorney of the proper county for the use of the General Fund of such county.

SEC. 3083. The Secretary of the State Board of Health must prepare blank forms of said registers for the State Printer, who must print as many copies as the said Secretary shall direct, and deliver the same to the Secretary of State, who shall forward the same, from time to time, and in such numbers as shall be directed by the Secretary first mentioned, to the County Recorders of the several counties, who must carefully keep and distribute the same to the persons in the county who are required to keep the registers and make the reports provided in this chapter. [In effect March 16, 1878.]

SEC. 3084. No person shall inter, cremate, or otherwise dispose of any human body, in any city, county, or city and county, without having first obtained a permit therefor. In incorporated cities, or counties, or cities and counties, the permit must be obtained from the person authorized to grant the same by any law, ordinance, or resolution passed for that purpose. But in the absence of such law, ordinance, or resolution, the permit must be obtained from either the Coroner, or Health Officer, Board of Health, or if the Coroner be absent, then from the Health Officer or Board of Health; and if there be no Board of Health or Health Officer, then from a Justice of the Peace. The person applying for a per-

mit must produce and file with the officer issuing the permit a certificate signed by a physician, or a Coroner, or two reputable citizens, setting forth as near as possible the name, age, color, place of birth, occupation, date, locality, and cause of death of deceased. And no permit shall be granted without the production of such certificate. Such permit must be filed with the County Recorder, and the person so filing is entitled to the compensation provided for in section three thousand and seventy-seven of this Code, but if any other registration of the death of the deceased shall have been made, the Recorder must record the name but once. [Approved February 25, 1889; in effect thirty days after.]

PART IV—Of the Government of Counties, Cities, and Towns.

TITLE II—The Government of Counties.

CHAPTER II.

THE BOARD OF SUPERVISORS.

ARTICLE II.

GENERAL PERMANENT POWERS.

SEC. 4046. The Boards of Supervisors, in their respective counties, have jurisdiction and power, under such limitations and restrictions, as are prescribed by law:

* * * * *

20. To adapt to the county the provisions in this Code for the preservation of the health of San Francisco or Sacramento, for such limited time as they may deem proper, and to provide for the expense thereof.

ADDITIONAL STATUTES OF CALIFORNIA.

CHAPTER CCXXIX.

An Act to provide for the grading of public alleys and the construction of sewers therein in the city of Sacramento.

[Approved March 21, 1868.]

SECTION 1. Whenever the Board of Trustees of the city of Sacramento shall deem it expedient to construct a sewer in any public alley, they may order such sewer to be constructed, after having published a notice of such intention in some daily newspaper printed in said city, for the period of ten days, unless the owners of more than one half in

extent of the land and lots bisected by such alley shall have made written objections thereto, and delivered the same to the Clerk of said Board of Trustees within the said period of ten days.

SEC. 2. If the owners, or their duly authorized agents, of more than one half in extent of the lands and lots in any block of land bisected by any such alley shall petition said Board of Trustees, in writing, to cause a sewer to be constructed through the same, the said Board of Trustees shall order the same to be done; or whenever the Board of Health of the city of Sacramento shall, by an order duly made and entered on their records, declare that it is necessary for the public health or cleanliness that a sewer should be constructed in any public alley in said city, and shall have delivered a certified copy of said order to the Board of Trustees, the said Board of Trustees shall order such sewer or sewers constructed, and proceed in the same manner as if said work had been petitioned for by the requisite number of property owners; as above. The cost of constructing that portion of all sewers that extend across streets, or that extends from the line of the block to the main sewer, shall be paid by the city out of the Special Street Fund.

CHAPTER CCCXXXIV.

An Act to authorize the establishment of a Board of Health in the city of Sacramento.

[Approved March 27, 1868.]

SECTION 1. The Board of Trustees of the city of Sacramento shall have power to establish, by ordinance, a Board of Health for the city of Sacramento. Said Board of Health shall consist of five practicing physicians, who shall each be graduates of a medical college of recognized respectability, and the President of the Board of Trustees shall be ex officio President of the Board of Health.

SEC. 2. The Board of Health shall have a general supervision of all matters appertaining to the sanitary condition of said city; and full powers are hereby given to said Board to adopt such measures and make such orders and regulations as at any time, in their opinion, the public safety may require, and not in contravention of any law; but such orders and regulations shall not take effect until approved by resolution or order of the Board of Trustees of said city.

SEC. 3. The Trustees of said city shall by ordinance provide, in such manner as to them shall seem best, for enforcing such orders and regulations as the Board of Health shall from time to time adopt.

SEC. 4. The Board of Health now recognized by an ordinance passed by the Trustees of said city, shall continue to perform the duties pertaining to their office until their successors are duly appointed and qualified.

SEC. 5. This Act shall take effect from and after its passage.

CHAPTER CCCXLVI.

An Act amendatory of and supplementary to an Act to authorize the establishment of a Board of Health in the city of Sacramento, approved March 27, 1868.

[In effect March 29, 1870.]

SECTION 1. The Board of Trustees of the city of Sacramento shall have power, and it is hereby made their duty, to establish by ordinance a Board of Health for the city of Sacramento. Said Board of Health shall consist of five practicing physicians, who shall each be graduates of a medical college of recognized respectability, and the President of the Board of Trustees shall be ex officio President of the Board of Health.

SEC. 2. The Board of Health of the city of Sacramento now recognized by the Board of Trustees shall have a general supervision of all matters appertaining to the sanitary condition of said city, and full powers are hereby given to said Board of Health over all questions of foul or defective drainage, and of the disinfecting and cleaning of streets, alleys, cellars, cesspools, or nuisances of any description, and of low places within the city limits calculated to receive and retain unhealthy deposits.

SEC. 3. The Board of Health shall exercise a general supervision over the death records of the city of Sacramento, and adopt such forms and regulations for the use and government of physicians, undertakers, and Superintendents of Cemeteries as in their judgment may be best calculated to secure reliable statistics of the mortality in said city and prevent the spread of disease.

SEC. 4. The Board of Trustees of the city of Sacramento shall, by ordinance or otherwise, provide for enforcing such orders and regulations as the Board of Health may from time to time adopt; and in times of epidemics, or when deemed necessary by the Board of Health, a Health Officer shall be employed to enforce the laws in relation to the sanitary condition of said city.

SEC. 5. All expenses necessarily incurred in carrying out the provisions of this Act shall be provided for by the Board of Trustees of the city of Sacramento, who are hereby authorized and directed to make appropriation therefor out of the special fund called the Street Fund in the Act entitled an Act to amend an Act to incorporate the city of Sacramento, approved April twenty-fifth, eighteen hundred and sixty-three, approved March eighteenth, eighteen hundred and seventy.

CHAPTER CCCCXI.

An Act to confer further powers on the Board of Trustees of the city of Sacramento.

[Approved March 31, 1876.]

SECTION 1. The Board of Trustees of the city of Sacramento are hereby authorized and empowered, and it is made their duty, to require all lots, and portions of lots, in the city of Sacramento, north of R

extent of the land and lots bisected by such alley shall have made written objections thereto, and delivered the same to the Clerk of said Board of Trustees within the said period of ten days.

SEC. 2. If the owners, or their duly authorized agents, of more than one half in extent of the lands and lots in any block of land bisected by any such alley shall petition said Board of Trustees, in writing, to cause a sewer to be constructed through the same, the said Board of Trustees shall order the same to be done; or whenever the Board of Health of the city of Sacramento shall, by an order duly made and entered on their records, declare that it is necessary for the public health or cleanliness that a sewer should be constructed in any public alley in said city, and shall have delivered a certified copy of said order to the Board of Trustees, the said Board of Trustees shall order such sewer or sewers constructed, and proceed in the same manner as if said work had been petitioned for by the requisite number of property owners; as above. The cost of constructing that portion of all sewers that extend across streets, or that extends from the line of the block to the main sewer, shall be paid by the city out of the Special Street Fund.

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SEC. 2. The Board of Health shall have a general supervision of all matters appertaining to the sanitary condition of said city; and full powers are hereby given to said Board to adopt such measures and make such orders and regulations as at any time, in their opinion, the public safety may require, and not in contravention of any law; but such orders and regulations shall not take effect until approved by resolution or order of the Board of Trustees of said city.

SEC. 3. The Trustees of said city shall by ordinance provide, in such manner as to them shall seem best, for enforcing such orders and regulations as the Board of Health shall from time to time adopt.

SEC. 4. The Board of Health now recognized by an ordinance passed by the Trustees of said city, shall continue to perform the duties pertaining to their office until their successors are duly appointed and qualified.

SEC. 5. This Act shall take effect from and after its passage.

CHAPTER CCCXLVI.

An Act amendatory of and supplementary to an Act to authorize the establishment of a Board of Health in the city of Sacramento, approved March 27, 1868.

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SEC. 2. The Board of Health of the city of Sacramento now recognized by the Board of Trustees shall have a general supervision of all matters appertaining to the sanitary condition of said city, and full powers are hereby given to said Board of Health over all questions of foul or defective drainage, and of the disinfecting and cleaning of streets, alleys, cellars, cesspools, or nuisances of any description, and of low places within the city limits calculated to receive and retain unhealthy deposits.

SEC. 3. The Board of Health shall exercise a general supervision over the death records of the city of Sacramento, and adopt such forms and regulations for the use and government of physicians, undertakers, and Superintendents of Cemeteries as in their judgment may be best calculated to secure reliable statistics of the mortality in said city and prevent the spread of disease.

SEC. 4. The Board of Trustees of the city of Sacramento shall, by ordinance or otherwise, provide for enforcing such orders and regulations as the Board of Health may from time to time adopt; and in times of epidemics, or when deemed necessary by the Board of Health, a Health Officer shall be employed to enforce the laws in relation to the sanitary condition of said city.

SEC. 5. All expenses necessarily incurred in carrying out the provisions of this Act shall be provided for by the Board of Trustees of the city of Sacramento, who are hereby authorized and directed to make appropriation therefor out of the special fund called the Street Fund in the Act entitled an Act to amend an Act to incorporate the city of Sacramento, approved April twenty-fifth, eighteen hundred and sixty-three, approved March eighteenth, eighteen hundred and seventy.

CHAPTER CCCCXL.

An Act to confer further powers on the Board of Trustees of the city of Sacramento.

[Approved March 31, 1876.]

SECTION 1. The Board of Trustees of the city of Sacramento are hereby authorized and empowered, and it is made their duty, to require all lots, and portions of lots, in the city of Sacramento, north of R

Street, west of Fourteenth Street, south of that portion of the north levee lying east of Sixth Street, south of that portion of I Street lying west of Sixth Street and east of the Sacramento River, which are covered with stagnant water a portion of the year, to be filled up to such level or grade as will prevent the same from being so covered.

Sec. 2. Whenever said Board shall declare a lot or portion of lot to be included within the provisions of section one herein, they shall cause to be entered in their minutes of proceedings an order, which may be in substance in the following form: The Board of Trustees of the city of Sacramento hereby determine that (here describe the real estate) is covered with stagnant water portions of the year. It is therefore ordered that the owner or owners thereof fill up the same to a proper level, to be fixed by the City Surveyor, or that the same be filled up at his or their expense. The owner of any lot, or portion thereof, included in such order, may at any time prior to awarding a contract for doing the work, as provided in section three herein, present and file with the Board a protest against the filling up of such lot as contemplated by the order, on the ground that such lot, or portion thereof, is not, during any portion of the year, covered with stagnant water. And if, on a hearing of such protest, the Board finds the same to be true, they shall, by their order, exclude such lot, or portion of a lot, from their original order; but if the Board finds the protest to be not true, they shall proceed as if no protest had been presented and filed. [Amendment of March 30, 1878.]

* * * * *
[Other sections relate to fixing grade, awarding contracts, assessment and payment of costs.]

CHAPTER CCXXXII.

[Stats. of 1875-6, p. 306.]

SECTION 4. No person, master, captain, or conductor in charge of any boat, vessel, railroad car, or public or private conveyance, shall receive for transportation, or shall transport, the body of any person who has died within the limits of the City and County of San Francisco, without obtaining a permit for the same from the Health Officer, which permit must accompany the body to its destination; and no person, master, captain, or conductor, as aforesaid, shall bring into or transport through the said city and county the dead body of any person, unless it be accompanied with a certificate from some proper authority of the place whence it came, stating name, age, sex, and cause of death, which certificate shall be filed at the Health Office; *provided*, that in no case shall the body of any person who died of a contagious disease be brought to the city within one year of the day of death.

CHAPTER DCLXXIII.

An Act to protect public health from infection caused by exhumation and removal of the remains of deceased persons.

[In force May 1, 1878.]

SECTION 1. It shall be unlawful to disinter or exhume from a grave, vault, or other burial place, the body or remains of any deceased person, unless the person or persons so doing shall first obtain, from the Board of Health, Health Officer, Mayor, or other head of the municipal government of the city, town, or city and county, where the same are deposited, a permit for said purpose. Nor shall such body or remains disinterred, exhumed, or taken from any grave, vault, or other place of burial or deposit, be removed or transported in or through the streets or highways of any city, town, or city and county, unless the person or persons removing or transporting such body or remains shall first obtain from the Board of Health, or Health Officer (if such Board or officer there be), and from the Mayor or other head of the municipal government of the city or town, or city and county, a permit, in writing, so to remove or transport such body or remains in and through such streets and highways.

SEC. 2. Permits to disinter or exhume the bodies or remains of deceased persons, as in the last section, may be granted, provided the person applying therefor shall produce a certificate from the Coroner, the physician who attended such deceased person, or other physician in good standing cognizant of the facts, which certificate shall state the cause of death, or disease of which the person died, and also the age and sex of such deceased; *and provided further*, that the body or remains of deceased shall be inclosed in a metallic case or coffin, sealed in such manner as to prevent, as far as practicable, any noxious or offensive odor or effluvia escaping therefrom, and that such case or coffin contains the body or remains of but one person, except where infant children, of the same parent or parents, or parent and children, are contained in such case or coffin. And the permit shall contain the above conditions, and the words: "Permit to remove and transport the body of ———, age———, sex———," and the name, age, and sex shall be written therein. The officer of the municipal government of the city or town, or city and county, granting such permit, shall require to be paid for each permit the sum of ten dollars, to be kept as a separate fund by the Treasurer, and which shall be used in defraying expenses of and in respect to such permits, and for the inspection of the metallic cases, coffins, and inclosing boxes herein required; and an account of such moneys shall be embraced in the accounts and statements of the Treasurer having the custody thereof.

SEC. 3. Any person or persons who shall disinter, exhume, or remove, or cause to be disinterred, exhumed, or removed, from a grave, vault, or other receptacle or burial place, the body or remains of a deceased person without a permit therefor, shall be guilty of a misdemeanor, and be punished by a fine not less than fifty nor more than five hundred dollars, or by imprisonment in the County Jail for not less than thirty days nor more than six months, or by both such fine and imprisonment. Nor shall it be lawful to receive such body, bones, or remains on any

vehicle, car, barge, boat, ship, steamship, steamboat, or vessel for transportation in or from this State, unless the permit to transport the same is first received, and is retained in evidence by the owner, driver, agent, superintendent, or master of the vehicle, car, or vessel.

SEC. 4. Any person or persons who shall move or transport, or cause to be moved or transported, on or through the streets or highways of any city or town, or city and county, of this State, the body or remains of a deceased person, which shall have been disinterred or exhumed without a permit, as described in section two of this Act, shall be guilty of a misdemeanor, and be punishable as provided in section three of this Act.

SEC. 5. Any person who shall give information to secure the conviction of any person or persons for the violation of the provisions of this Act, shall be entitled to receive the sum of twenty-five dollars, to be paid from the fund collected from fines imposed and accruing under this Act.

SEC. 6. Nothing in this Act contained shall be taken to apply to the removal of the remains of deceased persons from one place of interment to another cemetery or place of interment within this State; *provided*, that no permit shall be issued for the disinterment or removal of any body unless such body has been buried for one year or more, without the written consent of the Mayor, Chairman of the Board of Supervisors, or City Council of any municipality of the State. [As amended and passed, March, 1889.]

CHAPTER CCXLVII.

An Act authorizing the Mayor and Common Council of the City of San José to establish and provide for the maintenance of a Board of Health.

[Approved March 16, 1878.]

SECTION 1. The Mayor and Common Council of the city of San José may establish, by ordinance, a Board of Health therefor, to consist of five regular practicing physicians, graduates of a medical college of recognized respectability.

SEC. 2. The members of the Board hold their offices at the pleasure of the appointing power.

SEC. 3. The Board of Health of the city of San José has a general supervision of all the matters appertaining to the sanitary condition of the city, and make such rules and regulations in relation thereto as are not inconsistent with law.

SEC. 4. The Mayor is ex officio President of the Board. The Board must meet monthly, and at such other times as the President may direct. In the absence of the President, the Board may elect a Chairman, who is clothed with the same power as the President.

SEC. 5. The Health Officer of the city of San José is elected by the Board of Health, and holds office at its pleasure. He must be a graduate of some medical college in good standing, and must reside within the city of San José.

SEC. 6. The Health Officer may perform all acts which Quarantine Officers are usually authorized to perform, and he is the executive officer of the Board of Health.

SEC. 7. The Board of Health may locate and establish pesthouses, and cause to be removed thereto, and kept, any person having a contagious or infectious disease; may discontinue or remove the same, and make such rules and regulations regarding the conduct of the same as are needful.

SEC. 8. The Board of Health may exercise a general supervision over the death records of the city of San José, and may adopt such forms and regulations for the use and governance of physicians, and undertakers, and Superintendent of Cemeteries, as in their judgment may be best calculated to secure reliable statistics of the mortality in the city, and prevent the spread of disease.

SEC. 9. The Mayor and Common Council of the city of San José must, by ordinance or otherwise, provide for enforcing such orders and regulations as the Board of Health may from time to time adopt.

SEC. 10. All expenses necessarily incurred in carrying out the provisions of this article must be provided for by the Mayor and Common Council of the city of San José, who may make appropriation therefor out of the Special Street Fund, if the same is sufficient; if not, they may, by taxation, provide a fund therefor.

SEC. 11. The Mayor and Common Council must fix the compensation of the Board of Health and Health Officer.

CHAPTER CCCXXV.

An Act to provide and maintain a system of sewerage in the city of Petaluma, and to take private lands therefor.

[In effect March 23, 1878.]

SECTION 1. The Board of Trustees of the city of Petaluma are hereby empowered and directed to have surveyed, laid out, established, constructed, and maintained, a general system of sewerage for the city of Petaluma, and for that purpose shall employ a competent engineer to survey, map, and plat such contemplated sewerage, showing the location, length, and size of such sewers, which survey, map, and plat, when completed, with his recommendations, he shall file with the Clerk of the Board of Trustees; upon the filing of which, the Board of Trustees shall give at least ten days' notice, by publication in some newspaper published in said city, of the time and place when they will consider said report and hear objections, and may modify and correct the same; and so modified and corrected shall, by resolution, adopt the same, or any part thereof, as the official map of sewers. The compensation of such engineer, and such assistants as may be required, shall be determined by said Board, and shall be paid by warrant on the Sewer Fund of said city.

SEC. 2. In order to provide for the necessary and proper drainage and sewerage of the city of Petaluma, the Board of Trustees thereof are hereby authorized to procure the right of way by purchase, or condemnation, for such main and lateral sewers or drains as they may deem proper for the sewerage and drainage of said city; such rights of way may be thus secured through lands within the corporate limits, and

also when required through lands adjacent to and without said city, under the provisions of part three, title seventeen, of the Code of Civil Procedure, for the purpose of condemning such lands, or the right of way through the same, to the use of the city for public drains or sewers; *provided*, that the benefits resulting to the land remaining or adjoining may be offset against the value of the land actually taken, as also against any damages resulting to such adjacent land from such improvement.

SEC. 3. The Board of Trustees of the city of Petaluma, in addition to the taxes now authorized by law, are hereby authorized and empowered to levy annually an additional tax on all real and personal property of said city, not to exceed twenty cents on each one hundred dollars, to be levied and collected at the same time and in the same manner as other city taxes, and to be known as the sewer tax, which shall constitute a separate fund, to be known as the "Sewer Fund."

SEC. 4. It shall be the duty of the Board of Trustees to construct, maintain, and keep in repair, according to the general system of sewerage adopted, such sewers as from time to time they may deem necessary for the health and welfare of said city.

SEC. 5. All proceedings, contracts, and work in relation to the construction of sewers under this Act, shall be governed in all respects by the provisions of the city charter in relation to street work, except that no petition of property owners shall be necessary. The Board must not, without the consent of owners of adjacent property, change the width of any sidewalk, after said sidewalk has been constructed, for a period of five years.

CHAPTER CCCIV.

An Act to promote the sanitary condition of towns and villages in Fresno County.

[Approved March 20, 1873.]

SECTION 1. It is unlawful for any person, being a resident within any town or village, incorporated or unincorporated, which contains ten or more dwellings, to have or allow on his, her, or their premises, or permit to accumulate upon the half of any street or alley contiguous thereto, any filth or rubbish, or have any deposit of excrement or other filth upon either, or to permit such premises to become in any manner filthy or in an unhealthy condition.

SEC. 2. Upon the application of any resident of any such town or village, if unincorporated, the Board of Supervisors of the county wherein the same is situate, shall define and place of record in their minutes the limits and boundaries thereof; said Board shall appoint one of the Constables of the township wherein such town or village is situate, and notify him of his appointment, to carry out the provisions of this Act as hereinafter specified.

SEC. 3. It is the duty of such Constable, when so appointed, to inspect the premises of every street, alley, or vacant lot within the limits of the town or village for which he is appointed at least twice during each month, upon the first and third Mondays thereof, and in case he find that any premises, or the half of any streets or alleys con-

ous thereto, have upon them any filth or rubbish, or any deposit of excrement or other filth, he shall give written notice to the owner or occupant of such premises to remove the same; and in case the same be not removed within three days thereafter, he shall cause it to be done and such premises thoroughly cleansed in the manner directed by the Health Officer of the county, if there be one, at the expense of the owner or occupant, including his fee of two dollars for each premises so cleansed by him; and it is the duty of such Health Officer to give written directions to such Constable as to how he shall cleanse premises, and such Health Officer shall, at the request of any citizen, examine any premises and require such Constable to cleanse the same and see that such cleansing is properly and efficiently done.

SEC. 4. If said expenses and fee be not paid on presentation of his itemized account therefor, the Constable may maintain action therefor, including a reasonable attorney's fee, to be fixed by the Court; and from the execution in such action no property of the defendant shall be exempt.

SEC. 5. If the Constable cannot find the owner or occupant of any premises within the limits of the town for personal service of the notice hereinbefore mentioned, such notice may be served by posting the same upon some conspicuous place on such premises.

SEC. 6. For every failure or refusal of the Constable or Health Officer to perform any of their duties under this Act, they shall, respectively, forfeit fifty dollars, to be recovered by action, one half to be paid to any person bringing such action, and the other half into the County Indigent Sick Fund. The sureties of the Constable shall be liable for such penalty; but the Health Officer shall not, in the performance of his duties, be required to go beyond the limits of the town wherein he resides.

SEC. 7. This Act shall take effect immediately, and shall apply only to the county of Fresno.

CHAPTER CCCLXXIV.

An Act to establish a Board of Health for the county of Tulare.

[In effect March 26, 1878.]

SECTION 1. There shall be a Board of Health in and for the county of Tulare, consisting of three practical physicians, who are graduates of some medical college in good standing, two of whom, at least, shall be residents of the city of Visalia; and said Board shall serve without compensation.

SEC. 2. The Board of Supervisors of the county of Tulare, at their next regular meeting in May, eighteen hundred and seventy-eight, shall appoint a Board of Health for said county, one of whom shall hold office for the term of one year thereafter, and one for two years, and the other for three years, to be designated by said Board of Supervisors; and annually thereafter, at their regular meeting in May, said Board of Supervisors shall appoint a member of said Board of Health, who shall hold office for the term of three years; and all vacancies shall be made by said Board of Supervisors by appointment.

SEC. 3. The Board of Health shall have general supervision of all matters appertaining to the sanitary condition of said county, and full powers are hereby given to said Board to adopt such measures and make such orders and regulations as at any time, in their opinion, the public safety may require, and not in contravention of any law. They shall have power to declare any place where they shall have reason to believe a pestilential, contagious, or infectious disease is probably prevailing to an alarming extent to be an infected place, and to fix the period for so considering such place, notice of which shall be given by posting notices or by publication, as said Board shall deem proper.

SEC. 4. All the necessary expenses incurred by said Board of Health for printing, stationery, etc., shall be allowed by the Board of Supervisors and ordered paid out of the General Fund of said county.

SEC. 5. The Board of Health may appoint a clerk, who shall receive a reasonable compensation for his services, not exceeding two hundred dollars per annum, to be fixed and allowed by the Board of Supervisors and payable out of the General Fund of said county.

SENATE CONCURRENT RESOLUTION No. 25.

Relative to appointment of the members of the State Board of Health to consider the subject of a hospital for consumptives.

[Adopted April, 1880.]

Resolved, the Assembly concurring, That a committee of three members of the State Board of Health, to be designated by the Governor, be and are hereby appointed to consider the subject of a State Hospital for Consumptives, to determine a suitable locality, to investigate the probable cost, to devise a general scheme for the construction and management of such an institution, and to report the results of their investigations to the Legislature at its next session.

ASSEMBLY JOINT RESOLUTION No. 7.

Relative to the procuring of a quarantine depot.

[Adopted April 10, 1880.]

WHEREAS, The city of San Francisco, by reason of its commercial relations with Asiatic ports, is alarmingly exposed to the introduction of contagious diseases; and whereas, the port of San Francisco has no place where passengers and cargo can be landed and the necessary sanitary precautions adopted; therefore, be it

Resolved by the Assembly, the Senate concurring, That our Senators and Representatives are hereby requested to use their utmost endeavors to receive from the General Government a portion of one of the islands in the bay of San Francisco for use as a quarantine depot.

Resolved, That the Governor be requested to transmit a copy of these resolutions to each of our Senators and Representatives in Congress.

ASSEMBLY CONCURRENT RESOLUTION No. 23.

Relative to the establishment of a quarantine station on Angel Island.

[Adopted 1890.]

WHEREAS, It is necessary that some convenient place should be provided for quarantine grounds in the harbor of San Francisco, and near the city; and whereas, the State Board of Health, after the most careful examination, are unable to find any suitable place in said harbor, except the northern end of Angel Island, and near the eastern side thereof; therefore,

Resolved by the Assembly, the Senate concurring, That our Senators be instructed, and our Representatives in Congress be requested, to procure a strip of land jutting out into the bay at the northeastern part of Angel Island, in the harbor of San Francisco, consisting of not more than two acres, from the Government of the United States, as a quarantine station for San Francisco, and, if necessary, to procure the necessary legislation for that purpose.

Resolved, That a copy of these resolutions be forwarded by the Governor to each of our Senators and Representatives in Congress.

CHAPTER XC.

An Act to prevent the introduction of contagious or infectious diseases into the State of California.

[In effect March 15, 1883.]

SECTION 1. Whenever there shall exist, in the opinion of the State Board of Health, imminent danger of the introduction of contagious or infectious diseases into the State of California, by means of railroad communication with other States, the State Board of Health are authorized, and it is hereby made their duty, to make or cause to be made, by an accredited agent or inspector, an inspection of all railroad cars coming into the State at such point, or between such points within the State limits as may be selected for the purpose.

SEC. 2. Such inspection shall be made, where practicable, during the ordinary detention of a train at a station, or while in transit between stations, and in all cases shall be so conducted as to occasion the least possible detention or interruption of travel or inconvenience to the railroad companies, so far as consistent with the purposes of this Act.

SEC. 3. Should the discovery be made of the existence among the passengers of any case or cases of dangerous, contagious, or infectious disease, the said Board of Health, or their agent or inspector, under rules and conditions prescribed by them as being applicable to the nature of the disease, shall have power to cause the side-tracking or detention of any car or cars so infected, to isolate the sick, or remove them to a suitable place for treatment, to establish a suitable refuge station, to cause the passengers and materials in such infected car to be subjected to disinfection and cleansing before proceeding farther into the State,

and, in the case of smallpox, to offer free vaccination to all persons exposed in any car or at any station.

SEC. 4. The sum of five hundred dollars is hereby appropriated out of any moneys in the treasury not otherwise appropriated, to be expended solely for the purposes of this Act, and all expenditures herein authorized shall be specified in an itemized account to be presented to the State Board of Examiners, and paid as other demands on the treasury are paid; *provided*, that in no case shall the sum expended exceed that herein specially appropriated for the purpose.

CHAPTER XIV.

An Act to grant to Boards of Health, or Health Officers, in cities and cities and counties, the power to regulate the plumbing and drainage of buildings, and to provide for the registration of plumbers.

[In force March 3, 1885.]

SECTION 1. It shall not be lawful for any person to carry on business, or labor as a master or journeyman plumber, in any incorporated city, or in any city and county, in this State, until he shall have obtained from the Board of Health of said city, or city and county, a license authorizing him to carry on business, or labor as such mechanic. A license so to do shall be issued only after a satisfactory examination by the Board of each applicant upon his qualifications to conduct such business, or to so labor. All applications for license, and all licenses issued, shall state the name in full, age, nativity, and place of residence of the applicant or person so licensed. It shall be the duty of the Secretary of each Board of Health to keep a record of all such licenses issued, together with an alphabetical index of the same. [As amended March 9, 1887.]

SEC. 2. A list of all licensed plumbers shall be published in the yearly report of the Health Officer or Board of Health. [As amended March 9, 1887.]

SEC. 3. The drainage and plumbing of all buildings, both public and private, hereafter erected in any city, or city and county, shall be executed in accordance with plans previously approved in writing by the Board of Health of said city, or city and county, and suitable drawings and description of said drainage and plumbing shall, in each case, be submitted to the Board of Health, and placed on file in the Health Office. The said Board of Health is also authorized to receive and place on file drawings and descriptions of the drainage and plumbing of buildings erected prior to the passage of this Act.

SEC. 4. The Board of Supervisors, or other city, or city and county officials, whose duty it is to make appropriation and tax levies for general purposes of such city, or city and county, shall make the necessary appropriations and tax levies, and shall insert the same in the yearly tax levy, to provide for carrying out the provisions of this Act. Such appropriations and tax levy shall be made at the same time and in the same manner as appropriations and tax levies are made for other city, or city and county purposes.

SEC. 5. In any city, or city and county, where there is under existing laws a Health Officer but no Board of Health, such Health Officer shall perform all the duties required by this Act of the Board of Health, until a Board of Health shall be created; and in any city, or city and county, where there is no Health Officer nor Board of Health, the Board of Supervisors, or City Council, or other municipal legislative Board or body, shall create a Board of Health, who shall perform all the duties required by this Act of the Board of Health or Health Officer.

SEC. 6. Any Superior Court, or Judge thereof, shall have power to restrain, by injunction, the continuance of work to be done upon or about buildings or premises where the provisions of this Act have not been complied with, and no undertaking shall be required as a condition to the granting or issuing of such injunction, or by reason thereof.

SEC. 7. Any person violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction shall be punished accordingly.

CHAPTER XXXVIII.

An Act to provide for analyzing the minerals, mineral waters, and other liquids, and the medicinal plants of the State of California, and of foods and drugs, to prevent the adulteration of the same.

[Approved March 9, 1885.]

SECTION 1. The Governor of the State of California shall appoint one of the professors of the State University of California of sufficient competence, knowledge, skill, and experience, as State Analyst, whose duty it shall be to analyze all articles of food, drugs, medicines, medicinal plants, minerals and mineral waters, and other liquids or solids which shall be manufactured, sold, or used within this State, when submitted to him, as hereinafter provided.

SEC. 2. The State Board of Health and Vital Statistics, or medical officers of health of any city, town, or of any city and county, or county, may, at the cost of their respective Boards or corporations, purchase a sample of any food, drugs, medicines, medicinal plants, mineral waters, or other liquids offered for sale in any town, village, or city in this State, and submit the same to the State Analyst, as hereinafter provided; and said Analyst shall, upon receiving such article duly submitted to him, forthwith analyze the same, and give a certified certificate to the Secretary of the State Board of Health submitting the same, wherein he shall fully specify the result of the analysis; and the certificate of the State Analyst shall be held in all the Courts of this State as prima facie evidence of the properties of the articles analyzed by him.

SEC. 3. Any person desiring an analysis of any food, drug, medicine, medicinal plant, soil, mineral water, or other liquid, shall submit the same to the Secretary of the State Board of Health, together with a written statement of the circumstances under which he procured the article to be analyzed, which statement must, if required by him, be verified by oath; and it shall be the duty of the Secretary of the State

Board of Health to transmit the same to the State Analyst, the expenses thereof to be defrayed by the said Board.

SEC. 4. The State Analyst shall report to the State Board of Health the number of all the articles analyzed, and shall specify the results thereof to said Board annually, with a full statement of all the articles analyzed, and by whom submitted.

SEC. 5. The State Board of Health may submit to the State Analyst any samples of food, drugs, medicines, medicinal plants, mineral waters, or other liquids, for analysis, as hereinbefore provided.

SEC. 6. It shall be competent for the Mineralogist of the State of California to submit to the State Analyst any minerals of which he desires an analysis to be made; *provided*, that the cost of the same shall be defrayed by the Mineralogical Bureau.

SEC. 7. The Board of State Viticultural Commissioners shall have the same privileges as are provided for the State Board of Health under this Act, with respect to samples of wines and grape spirits, and of all liquids and compounds in imitation thereof; and any person or persons desiring analyses of such products shall submit the same to the Secretary of the said Board of State Viticultural Commissioners, and the same shall be transmitted to the State Analyst, in the manner prescribed in section three of this Act. The analyses shall be made, and the certificates of the State Analyst shall be forwarded to the Secretary of the said Board of State Viticultural Commissioners, and shall have the same force and effect as provided for in section two of this Act, with respect to analyses made for the State Board of Health.

CHAPTER XXII.

An Act to appropriate money to prevent the introduction of contagious and infectious diseases.

[In force March 4, 1887.]

SECTION 1. The sum of ten thousand dollars is hereby appropriated out of the General Fund in the State Treasury, to be expended by the State Board of Health, under the direction of the Governor, for the prevention of the introduction of any contagious and infectious diseases into the State. The claims for such expenditures must be audited by the Board of Examiners; except that when a contingency arises, which, in the opinion of the Governor, demands the immediate use of money, the Controller may draw his warrant, upon the order of the Governor, in such sums, not exceeding one thousand dollars, as he may direct, in the name of the State Board of Health; *provided*, that an account must be thereafter filed with the Board of Examiners, and audited by it, and transmitted to the Controller, showing the manner of such expenditure.

CHAPTER XXIV.

An Act to encourage and provide for a general vaccination in the State of California.

[In force February 20, 1889.]

SECTION 1. The Trustees of the several common school districts in this State, and Boards of common school government in the several cities and towns, are directed to exclude from the benefits of the common schools therein any child or any person who has not been vaccinated, until such time when said child or person shall be successfully vaccinated; *provided*, that any practicing and licensed physician may certify that the child or person has used due diligence and cannot be vaccinated so as to produce a successful vaccination, whereupon such child or person shall be excepted from the operation of this Act.

SEC. 2. The Trustees or local Boards, annually, or at such special times to be stated by the State Board of Health, must give at least ten days' notice, by posting a notice in two or more public or conspicuous places within their jurisdiction, that provision has been made for the vaccination of any child of suitable age who may desire to attend the common schools, and whose parents or guardians are pecuniarily or otherwise unable to procure vaccination for such child.

SEC. 3. The said Trustees or Board must, within sixty days after the passage of this Act, and every year thereafter, ascertain the number of children or persons in their respective school districts, or subdivision of the city school government, being of an age suitable to attend common schools, who have not been already vaccinated, and make a list of the names of all such children or persons. It also shall be the duty of said Trustees or Board to provide, for the vaccination of all such children or persons in their respective school districts, a good and reliable vaccine virus wherewith to vaccinate such children or persons who have not been vaccinated. And when so vaccinated to give a certificate of vaccination, which certificate shall be evidence thereof for the purpose of complying with section one.

SEC. 4. The necessary expenses incurred by the provisions of this Act shall be paid out of the common school moneys apportioned to the district, city, or town. And if there be not sufficient money, the Trustees must notify the Board of Supervisors of the amount of money necessary, and the Board must, at the time of levying the county tax, levy a tax upon the taxable property in the district sufficient to raise the amount needed. The rate of taxation is ascertained by deducting fifteen per cent for delinquencies from the assessment, and the rate must be based upon the remainder. The tax so levied must be computed and entered upon the assessment roll by the County Auditor, and collected at the same time and in the same manner as State and county taxes, and when collected shall be paid into the county treasury for the use of the district.

SEC. 5. The Trustees of the several school districts of this State are hereby required to include in their annual report, and report to the Secretary of the State Board of Health, the number in their several districts between the ages of five and seventeen years who are vaccinated and the number unvaccinated.

CHAPTER V.

An Act to provide for the proper sanitary condition of factories and workshops, and the preservation of the health of the employes.

[In force February 6, 1889.]

SECTION 1. Every factory, workshop, mercantile or other establishment, in which five or more persons are employed, shall be kept in a cleanly state and free from the effluvia arising from any drain, privy, or other nuisance, and shall be provided, within reasonable access, with a sufficient number of water-closets or privies for the use of the persons employed therein. Whenever the persons employed as aforesaid are of different sexes, a sufficient number of separate and distinct water-closets or privies shall be provided for the use of each sex, which shall be plainly so designated, and no person shall be allowed to use any water-closet or privy assigned to persons of the other sex.

SEC. 2. Every factory or workshop in which five or more persons are employed shall be so ventilated while work is carried on therein that the air shall not become so exhausted as to be injurious to the health of the persons employed therein, and shall also be so ventilated as to render harmless, as far as practicable, all the gases, vapors, dust, or other impurities generated in the course of the manufacturing process or handicraft carried on therein, that may be injurious to health.

SEC. 3. No basement, cellar, underground apartment, or other place which the Commissioner of the Bureau of Labor Statistics shall condemn as unhealthy and unsuitable, shall be used as a workshop, factory, or place of business in which any person or persons shall be employed.

SEC. 4. If in any factory or workshop any process or work is carried on by which dust, filaments, or injurious gases are generated or produced that are liable to be inhaled by the persons employed therein, and it appears to the Commissioner of the Bureau of Labor Statistics that such inhalation could, to a great extent, be prevented by the use of some mechanical contrivance, he shall direct that such contrivance shall be provided, and within a reasonable time it shall be so provided and used.

SEC. 5. Every person, firm, or corporation employing females in any manufacturing, mechanical, or mercantile establishment shall provide suitable seats for the use of the females so employed, and shall permit the use of such seats by them when they are not necessarily engaged in the active duties for which they are employed.

SEC. 6. Any person or corporation violating any of the provisions of this Act shall be punished by a fine of not less than fifty nor more than one hundred dollars for each offense.

SEC. 7. It shall be the duty of the Commissioner of the Bureau of Labor Statistics to enforce the provisions of this Act.

CHAPTER CXLVIII.

An Act to create the office of Attorney for the State Board of Health and the Board of Health of the City and County of San Francisco.

[Approved March 31, 1891.]

SECTION 1. The office of Attorney for the State Board of Health and the Board of Health of the City and County of San Francisco is hereby created; such attorney shall be appointed by the Governor, and shall hold his office as such attorney for the term of four years, and until his successor is elected and qualified.

SEC. 2. It shall be the duty of such attorney to act for and represent the State Board of Health and the Board of Health of the City and County of San Francisco in all legal matters which may require their attention as such Boards of Health, and to specially represent and act for and in coöperation with said Boards of Health, when required by them, in the prevention of all acts and things which, in the judgment of said Boards of Health, or either of them, may have a tendency to be detrimental to the health of the people of the State; and in such other matters pertaining to the health of the State in general and the duties of said Boards of Health, to assist and aid them with his advice, and to represent and act for them in Court.

SEC. 3. The salary of such attorney shall be three thousand dollars per annum, and shall be paid out of the State Treasury, upon warrants drawn by the Controller, in the same manner as the salaries of other State officers are paid.

SEC. 4. All Acts and parts of Acts in conflict with this Act are hereby repealed.

SEC. 5. This Act shall take effect and be in force from and after its passage.

PENAL CODE.

PART I, TITLE IX, CHAPTER VII.

RELATIVE TO THE SMOKING OF OPIUM.

SEC. 307. Every person who opens and maintains, to be resorted to by other persons, any place where opium, or any of its preparations, is sold or given away, to be smoked at such place, and any person who at such place sells or gives away any opium, or its said preparation, to be there smoked or otherwise used, and every person who visits or resorts to any such place for the purpose of smoking opium, or its said preparations, is guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding five hundred dollars, or imprisonment in the county jail not exceeding six months, or by both such fine and imprisonment. [In effect March 4, 1881.]

PART I, TITLE X.

OF CRIMES AGAINST THE PUBLIC HEALTH.

- SECTION 370. Public nuisance defined.
371. Unequal damage.
372. Maintaining a nuisance a misdemeanor.
373. Establishing or keeping pesthouses within cities, towns, etc.
374. Putting dead animals in streets, rivers, etc.
376. Violation of quarantine laws by masters of vessels.
377. Willful violation of health laws.
378. Neglecting to perform duties under health law.
380. Apothecary omitting to label drugs, or labeling them wrongfully, etc.
382. Adulterating food, drugs, liquors, etc.
383. Disposing of tainted food, etc.
394. Exposing person infected with any contagious disease in a public place.
400. Using or exposing animal with glanders.
401. Animal having glanders to be killed.
402. Adulterating candy.

Sec. 370. Anything which is injurious to health, or is indecent, or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property, by an entire community or neighborhood, or by any considerable number of persons, or unlawfully obstructs the free passage or use, in the customary manner, of any navigable lake, or river, bay, stream, canal, or basin, or any public park, square, street, or highway, is a public nuisance. [In effect July 1, 1874.]

Sec. 371. An act which affects an entire community or neighborhood, or any considerable number of persons, as specified in the last section, is not less a nuisance because the extent of the annoyance or damage inflicted upon individuals is unequal. [In effect July 1, 1874.]

Sec. 372. Every person who maintains or commits any public nuisance, the punishment for which is not otherwise prescribed, or who willfully omits to perform any legal duty relating to the removal of a public nuisance, is guilty of a misdemeanor.

Sec. 373. Every person who establishes or keeps, or causes to be established or kept, within the limits of any city, town, or village, any pesthouse, hospital, or place for persons affected with contagious or infectious diseases, is guilty of a misdemeanor.

Sec. 374. Every person who puts the carcass of any dead animal, or the offal from any slaughter-pen, corral, or butcher shop, into any river, creek, pond, reservoir, stream, alley, public highway, or road in common use, or who attempts to destroy the same by fire within one fourth of a mile of any city, town, or village, and every person who puts the carcass of any dead animal, or any offal of any kind, in or upon the borders of any stream, pond, lake, or reservoir, from which water is drawn for the supply of the inhabitants of any city, city and county, or any town, in this State, so that the drainage from such carcass or offal may be taken up by or in such stream, pond, lake, or reservoir, or who allows the carcass of any dead animal, or any offal of any kind, to remain in or upon the borders of any such stream, pond, lake, or reservoir, within the boundaries of any lands owned or occupied by him, or who keeps any horses, mules, cattle, swine, sheep, or live stock of any kind, penned, corraled, or housed on, over, or on the borders of any such stream, pond, lake, or reservoir, so that the waters thereof shall become polluted by reason thereof, is guilty of a misdemeanor, and

upon conviction thereof shall be punished as prescribed in section three hundred and seventy-seven of this Code. [In effect March 23, 1876.]

Sec. 376. Every master of a vessel subject to quarantine or visitation by the quarantine officer, arriving in the port of San Francisco, who refuses or omits—

1. To proceed with and anchor his vessel at the place assigned for quarantine, at the time of his arrival; or,

2. To submit his vessel, cargo, and passengers to the examination of the quarantine officer, and to furnish all necessary information to enable that officer to determine to what length of quarantine and other regulations they ought, respectively, to be subject; or,

3. To remain with his vessel at the quarantine during the period assigned for her quarantine, and while at quarantine to comply with the regulations prescribed by law, and with such as any of the officers of health, by virtue of authority given them by law, shall prescribe in relation to his vessel, his cargo, himself, his passengers, or crew, is punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding two thousand dollars, or both. [In effect March 9, 1878.]

Sec. 377. Every person who is charged with a duty relating to the registration of deaths, under chapter three, title seven, of the Act to establish a Political Code, approved March twelfth, eighteen hundred and seventy-two, who—

1. Willfully fails to keep a registry of the name, age, residence, and time of death of a decedent; or,

2. Willfully fails to register with the County Recorder a certified copy of such register, as is provided for in said chapter; or,

3. Willfully inter, cremates, or otherwise disposes of any human body, in any city, county, or city and county, without having first obtained a permit, as provided for in said chapter; or,

4. Willfully grants a permit for the interment, cremation, or disposition of a dead human body, without the certificate provided for in said chapter; or,

5. Willfully violates any of the laws of this State relating to the preservation of the public health—

Is guilty of a misdemeanor, and is, unless a different punishment for such violation is prescribed by this Code, punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding one thousand dollars, or by both such fine and imprisonment. [Approved February, 1889.]

Sec. 378. Every person charged with the performance of any duty under the laws of this State relating to the preservation of the public health, who willfully neglects or refuses to perform the same, is guilty of a misdemeanor.

Sec. 380. Every apothecary, druggist, or person carrying on business as a dealer in drugs or medicines, or person employed as clerk or salesman by such person, who, in putting up any drugs or medicines, or making up any prescription, or filling any order for drugs or medicines, willfully, negligently, or ignorantly omits to label the same, or puts an untrue label, stamp, or other designation of contents, upon any box, bottle, or other package containing any drugs or medicines, or substitutes a different article for any prescribed or ordered, or puts up a

greater or less quantity of any article than that prescribed or ordered, or otherwise deviates from the terms of the prescription or order which he undertakes to follow, in consequence of which human life or health is endangered, is guilty of a misdemeanor, or if death ensues, is guilty of a felony.

SEC. 382. Every person who adulterates or dilutes any article of food, drink, drug, medicine, spirituous or malt liquor, or wine, or any article useful in compounding them, with a fraudulent intent to offer the same, or cause or permit it to be offered for sale as unadulterated or undiluted, and every person who fraudulently sells, or keeps, or offers for sale the same as unadulterated or undiluted, is guilty of a misdemeanor.

SEC. 383. Every person who knowingly sells, or keeps, or offers for sale, or otherwise disposes of any article of food, drink, drug, or medicine, knowing that the same has become tainted, decayed, spoiled, or otherwise unwholesome or unfit to be eaten or drank, with intent to permit the same to be eaten or drank, is guilty of a misdemeanor.

SEC. 394. Every person who willfully exposes himself, or another, afflicted with any contagious or infectious disease, in any public place or thoroughfare, except in his necessary removal in a manner the least dangerous to the public health, is guilty of a misdemeanor.

SEC. 400. Any person, persons, company, or corporation, who shall bring, or cause to be brought, or aid in bringing into this State any sheep, hog, horse, or cattle of any kind, or any domestic animals of any kind, knowing the same to be affected with any contagious or infectious diseases, shall be guilty of a misdemeanor. [As amended and approved March 19, 1889.]

SEC. 401. Every person who adulterates candy, by using in its manufacture terra alba, or any other deleterious substance or substances, or who sells, or keeps for sale, any candy or candies adulterated with terra alba, or any other deleterious substance or substances, is guilty of a misdemeanor. [In effect March 16, 1878.]

SEC. 402. Every animal having glanders or farcy shall at once be deprived of life by the owner or person having charge thereof, upon discovery or knowledge of its condition; and any such owner or person omitting or refusing to comply with the provisions of this section shall be guilty of a misdemeanor. [In effect April 16, 1880.]

OTHER PENAL STATUTES.

CHAPTER CXCV.

An Act to encourage the production and sale of pure and wholesome milk, and to prohibit and punish the production or sale of unwholesome or adulterated milk.

[Approved March 12, 1870.]

SECTION 1. It shall be unlawful for any person or persons to sell, exchange, or distribute, or expose for sale, exchange, or distribution, any impure, adulterated, or unwholesome milk; or to adulterate any milk for

the purpose of offering the same for sale, exchange, or distribution; or to keep any cows for the production of milk for market, sale, exchange, or distribution, in a crowded and unhealthy condition; or to feed the same on any food which would produce impure, diseased, or unwholesome milk; and every person or persons who shall engage in or carry on the sale, exchange, distribution, or any traffic in milk, shall have the cans in which the milk is exposed for sale, exchange, or distribution, and the vehicle from which the same is vended, exchanged, or distributed, conspicuously marked with his or their names; also indicating by said mark the locality from whence said milk is obtained or produced, and any sale, distribution, or exchange of any milk in cans or by a vehicle so marked as to convey the idea that said milk was produced from a different locality than it really was, shall be and is hereby forbidden.

SEC. 2. Any person violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and be punished by a fine not less than one hundred dollars for the first offense, and double such amount for each subsequent offense, and by imprisonment according to law, if such fine be not paid. One half of such fine shall be paid to the informer or prosecuting witness, and the other half to the School Fund of the county. And any person may be compelled to testify concerning violations of this Act; but such testimony shall not be used against such witness in any criminal prosecution.

SEC. 3. The Health Officer and Health Inspectors of the City and County of San Francisco shall inform against and diligently prosecute all persons violating the provisions of this Act.

SEC. 4. This Act shall take effect immediately after its passage.

CHAPTER CCCCXCVI.

An Act concerning lodging houses and sleeping apartments.

[In effect April 3, 1878.]

SECTION 1. Every person who owns, leases, lets, or hires to any person or persons, any room or apartment in any building, house, or other structure, within the limits of any incorporated city, or city and county, within the State of California, for the purpose of a lodging or sleeping apartment, which room or apartment contains less than five hundred cubic feet of space, in the clear, for each person so occupying such room or apartment, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished by a fine of not less than fifty dollars or more than five hundred dollars, or by imprisonment in the county jail, or by both such fine and imprisonment.

SEC. 2. Any person or persons found sleeping or lodging, or who hires for the purpose of sleeping in or lodging in any room or apartment which contains less than five hundred cubic feet of space, in the clear, for each person so occupying such room or apartment, shall be deemed guilty of a misdemeanor, and shall, upon conviction, be punished by a fine of not less than ten nor more than fifty dollars, or by both such fine and imprisonment.

SEC. 3. It shall be the duty of the Chief of Police, or such other

person to whom the police powers of the city are delegated, to detail a competent and qualified officer or officers of the regular force to examine into any violation of any of the provisions of this Act, and to arrest any person guilty of any such violation.

SEC. 4. The provisions of this Act shall not be construed to apply to hospitals, jails, prisons, insane asylums, or other public institutions.

SEC. 5. All Acts or parts of Acts in conflict with the provisions of this Act are hereby repealed.

CHAPTER CLXXXIX.

An Act to regulate the sale of certain poisonous substances.

[Approved April 16, 1880.]

SECTION 1. It shall be unlawful for any person to retail any of the substances poisonous, and by reason thereof dangerous to human life, without distinctly labeling the bottle, box, vessel, or package, and the wrapper or cover thereof in which such substance is contained, with the common or usual name thereof, together with the word "poison," and the name and place of business of the seller. Nor shall it be lawful for any person to retail any of the substances enumerated in either of said schedules to any person, unless, on due inquiry, it is found that the person receiving the same is aware of its poisonous character, and that it is to be used for a legitimate purpose.

SEC. 2. It shall be unlawful for any person to retail any of the substances enumerated herein, unless, before delivering the same, such person shall make, or cause to be made, in a book kept for that purpose only, an entry stating the date of the sale, the name and address of the purchaser, the name and quality of the substance sold, the purpose for which it is stated by the purchaser to be required, and the name of the dispenser. The book required by this Act shall be always open to inspection by the proper authorities. It shall also be the duty of the person dispensing any of the substances enumerated in either of said schedules to ascertain, by due inquiry, whether the name and address given by the person receiving the same are his true name and address, and for that purpose may require such person to be identified.

SEC. 3. Any person who shall dispense any of the substances enumerated in either of said schedules without complying with the regulations herein prescribed, shall, for every such offense, be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by a fine not exceeding five hundred dollars, or by imprisonment in the county jail not exceeding six months, or by both such fine and imprisonment; *provided*, that nothing in this Act shall be so construed as to apply to the prescriptions of any physician authorized to practice medicine under the laws of this State.

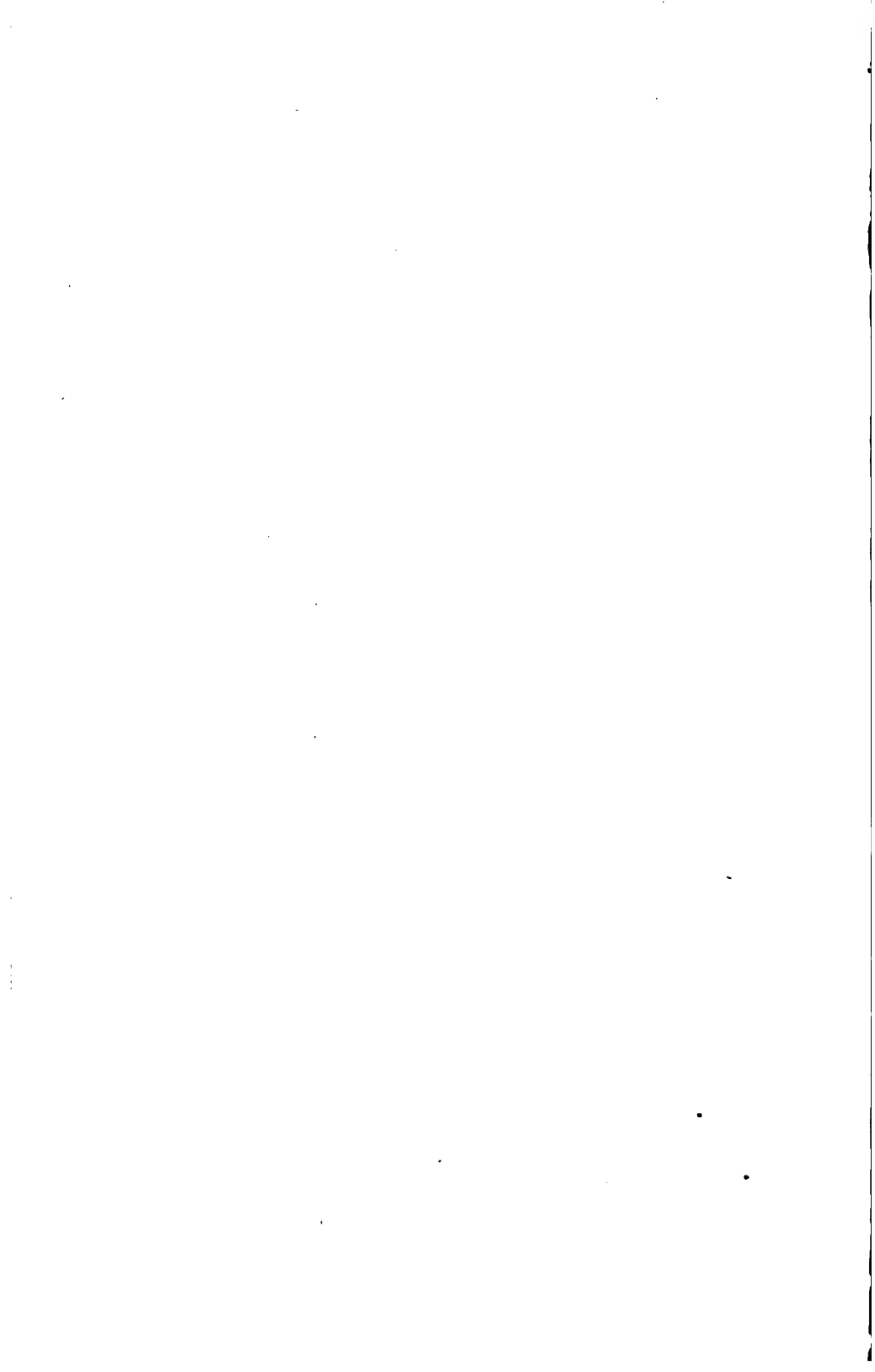
SCHEDULE "A."

Arsenic, corrosive sublimate, hydrocyanic acid, cyanite of potassium, strychnia, essential oil of bitter almonds, opium, aconite, belladonna, conium, nux vomica, henbane, tansy, savin, ergot, cotton root, digitalis,

chloroform, chloral hydrate, and all preparations, compounds, salts, extracts, or tinctures of such substances, except preparations of opium containing less than two grains to the fluid ounce.

SCHEDULE "B."

White precipitate, red precipitate, red and green iodides of mercury, colchicum, cantharides, oxalic acid, croton oil, sulphate of zinc, sugar of lead, carbolic acid, sulphuric acid, muriatic acid, nitric acid, phosphorus, and all preparations, compounds, salts, extracts, or tinctures of such substances.



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